

**Knowledge production, international information flows and intellectual  
property: an African perspective**

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**ABSTRACT**

Until a few decades ago, or at least until the publication in 1980 of the McBride Report *Many voices, one world*, the information problem in Africa tended to be seen as one of supplying Africa, an “under-developed” continent, with information generated in the developing countries: sustaining a North-South information flow through aid and charitable enterprises in support of African development efforts. The North-South information flow remains of vital importance. However, a balanced view requires that we also consider information flows in other directions: namely South-North and South-South information flows.

This paper considers these three forms of information flow from an African perspective, with the emphasis on the influence of international developments in intellectual property rights on North-South and South-North relations. It first considers current developments in intellectual property rights that threaten the North-South information flow, before stating the importance to the humanity of the world of South-North information flows, and lastly, exploring the most neglected of the three: information flows between African countries.

North-South information flows today face critical challenges through international efforts by multinational companies and the governments of developed countries, to tighten control over intellectual property. Prompted by the realisation that information is the strategic resource of our time, spurred on by the structural changes that are taking place in knowledge production and dissemination in the digital age, and concerned about widespread information piracy, the United States, the European Union and other governments are pushing through the adoption of stricter intellectual property regimes and employing their economic muscle to force their adoption by poorer countries. In the process, information is becoming a commodity and the information commons, that free space for the sharing of ideas and information that has supported the intellectual advancement of humankind, has become an endangered environment. Among the (hopefully) unintended consequences of this development could well be a reduction of the access that African countries have to North-generated information.

It seems hardly necessary to state that African societies, communities and scholars have much to contribute to a humane world. By a humane world we mean a world in which cultural diversity and different modes of imagining and knowing are appreciated and encouraged. Their suppression in order that all knowledge and understanding can be fitted into the strait-jacket of a dominant Western world-view is also an impoverishment of the wealthy nations. It can be argued, following the events of 11 September 2001, that such a humane world would also be a safer world for all.

This is not to say that the insights gained by African societies and communities over millennia of struggle with and adaptation to a harsh environment are not being appreciated. And today the interest is not only on the part of ethnological museums and collectors of “primitive” art. The latter part of the 20<sup>th</sup> century also saw the advent of modern-day “tomb raiders” who seek to corner and patent potentially lucrative indigenous knowledge. This form of “appreciation” is a mixed blessing. Africa needs to disseminate its contribution to the heritage of the world, without entering a new era of exploitation. African scholars and academic and research institutions face a dual challenge: to effectively disseminate their intellectual contribution, while at the same time jealously defending their intellectual property and that of traditional communities from selfish exploitation.

This paper takes a moral, rather than a legal view of intellectual property. It briefly considers the moral basis for compliance with intellectual property rights, taking human rights and specifically information rights as the point of departure and proposing the four types of social justice (commutative, contributive, distributive and retributive justice) as the moral tool for ensuring compliance with moral principles in the rough and tumble of the “free market” in the information “commodity”.

The implications for the management of the intellectual property manifested in African theses and dissertations is then considered in more detail. The emphasis is on finding the optimal balance between their effective and sustainable international dissemination and the needs and moral rights of the authors, their institutions, and the societies and communities which provided the research infrastructure and, in many cases, research data. We consider not only moral principles and guidelines for dealing with theses and dissertations, but also attempt to relate these to practical issues of recording knowledge, bibliographic organisation and dissemination, which are critical for the frequently neglected South-South dimension of information flow.

## Knowledge production, international information flows and intellectual property: an African perspective

### **Introduction**

Until a few decades ago, or at least until the publication of the report of the International Commission for the Study of Communication Problems (1980) *Many voices one world*,<sup>1</sup> the information problem in Africa tended to be seen as one of supplying Africa, an “under-developed” continent, with information generated in the developed countries: sustaining a North-South information flow through aid and charitable enterprises in support of African development efforts. However, a balanced view requires that we also consider information flows in other directions, namely South-North and South-South information flows.<sup>2</sup>

An important reason for considering South-North and South-South information flows is that we have realised that knowledge production is not the monopoly of the North. A growing awareness has developed of the wealth of Africa’s knowledge base. Historical research, as reflected in UNESCO’s eight volume *General history of Africa* (UNESCO 1981-1993) has shown that Africa’s history is not anywhere near as dark and featureless as had been assumed. Centres of learning have been rediscovered, eg. at Timbuktu, which rivalled their contemporaries in medieval Europe. We have been made aware of the contributions of ancient African thinkers and scholars<sup>3</sup> to “classical antiquity” and “western science”, or more correctly, to the shared knowledge of humankind. In recent years an appreciation has been developing of Africa’s indigenous knowledge. It is no coincidence that this is happening at the same time that the African Renaissance, the New Partnership for Africa’s Development (NEPAD), and the African Millennium are in the air, and that a new African Union has replaced the old Organization of African Unity.

Two responses can be observed to the rediscovery of Africa’s knowledge wealth: One is to share it, proudly. The other is to keep it hidden, lest it be discovered and stolen or exploited by the North. This is an emotive issue. Words such as “piracy” and “looting” occur in the discourse. The threats are real, but we need to deal with them rationally and ethically. It is tempting to retaliate against hegemonic systems of

knowledge production and dissemination by withholding our own treasures from the rest of humanity. But is it rational and ethical? Rationally, we need to consider whether we should we cut off our noses to spite our faces, isolating ourselves yet more from world knowledge production. Ethically, we need to consider whether Africa has a moral responsibility to contribute its knowledge to humanity. How do we find the optimal balance between, on the one hand, protecting our knowledge assets, Africa's intellectual property, and, on the other, growing these assets and putting them to work for Africa's development and, ultimately, for the benefit of humankind?

Although this paper is concerned with intellectual property, it takes a moral, rather than a legal view. Its emphasis is on knowledge, which has different kinds of value in different contexts for different players. This creates a tension between the information commons and information as exclusive private property. The authors' concern, elaborated in the first section, is that the balance between the public good and private interests has been disturbed. Our premise, set out in the second section, is that there are general moral principles that can serve as a basis for decisions on North-South, South-North and South-South information flows. We take human rights and specifically information rights, and the concept of the common good as our point of departure and propose the four types of social justice (commutative, contributive, distributive and retributive justice) as the moral tool for charting a course between the extremes of the capitalist "free market" approach and that of knowledge as the common good of humankind.

In light of this the next three sections consider three directions of information flow (North-South, South-North, and South-South) from an African perspective. We first explore current developments in scholarly publishing and intellectual property rights (IPR) that affect the North-South information flow, and consider current responses, such as the open access movement, to the growing imbalance between rights holders and authors. These relations also affect South-North information flows, where both exploitation (of indigenous knowledge, for example) and neglect (of Africa's scholarly contributions to the world) need to be countered. Lastly, we consider the most neglected of the three, South-South information flows<sup>4</sup> between African

countries. The implications for the management of the intellectual property manifested in African theses and dissertations are then briefly discussed.

### **Knowledge: private greed, public good**

There is a tendency to think of knowledge as an asset, or as a commodity. But knowledge does not behave like other commodities, such as land or mineral resources, which are finite. The person who imparts knowledge to others does not lose it. It remains the same whether it is known by one or by a million people. For example: the same knowledge embodied in a medical procedure or drug can save lives over and over again and (apart from cases of resistance to drugs by microbes) does not lose its value in terms of efficacy by being used repeatedly. However, its value to the knower in terms of marketable expertise may decline if it is widely disseminated. This shows that knowledge has different kinds of value.

- (a) **Instrumental value**: This is the value found in the application of knowledge to improve the capacity of humankind to cope with its environment. This instrumental value of knowledge is illustrated in the way African people utilise environmental knowledge to survive and make decisions regarding the nutritional value of plants. Knowledge has this value when it is used in the interests of humankind, for the common good (e.g. the Salk vaccine against polio).
- (b) **Competitive value**: Knowledge has competitive value by giving the knower a scarce resource that can be exploited to gain a livelihood, or some sort of competitive advantage. All knowledge tends to diffuse over time, albeit at different rates and in different spheres of society. But the competitive value lies in possessing knowledge that others do not (yet) have. In order to treat knowledge as a commodity and subject it to the laws of supply and demand, scarcity has to be created or maintained artificially, through secrecy or other restrictions on its dissemination and use. This is very old. In the Old Testament (1 Samuel 13:19-21) we read that in the time of King Saul the Israelites were not able to make objects of iron since the Philistines held a monopoly on this technology. It is this value of knowledge that gives rise to the saying, "knowledge is power". The desire to prevent the diffusion of knowledge with competitive value, or at least to delay its diffusion, gave rise to various forms of IPR enshrined in law from the 18th century (Copyright 2004). This normally leads to asymmetric information markets where one information owner has more information than the other. This can give rise to market inefficiencies and the creation of monopolies. We can distinguish two aspects of competitive value: **economic value** and **strategic value**. Economic value is associated especially with knowing how and strategic value (e.g. market intelligence, military intelligence) with knowing that.

- (c) **Accumulative value:** Although it is in the interest of the holders of certain categories of knowledge to keep it to themselves, knowledge is created cumulatively. Knowledge needed to create new knowledge. This gives rise to a third kind of value: the value of knowledge for the further development of science and scholarship. It is not in the interests of knowledge creators to impose a total blackout on what they know. To share and disseminate knowledge holds long-term benefits for them too. In a competitive environment holders of knowledge have to balance their short-term interests (which are served by maintaining their monopoly) and their long term interests (which are served by permitting the diffusion of their knowledge, so that it can be used in generating new knowledge). In our complex world, and given the complexity of our technology, few if any holders of knowledge are able to make scientific and scholarly progress without building on the contributions shared by others. But to ensure that such sharing takes place, all parties must be prepared to make contributions. Such sharing is to the benefit of the holders of knowledge not only because it enables them to proceed with the generation of new knowledge, but also because they, as members of society, benefit from any advantages that accrue to humankind as a whole, for example greater prosperity and well-being, more disposable income and more buoyant markets.
- (d) **Educational value:** This refers to the value of knowledge for education, to equip successive generations of humans to improve the quality of their lives and the quality of their environment.
- (e) **Cultural value:** This refers to the value of knowledge in strengthening the cohesion of communities and societies and enhancing the quality of communal life.
- (f) **Transcendent value:** This relates to the value of knowledge in satisfying aesthetic, religious, spiritual or higher needs (those that are labelled as “self-actualisation needs” in the hierarchy of Maslow (1954). Here knowledge has value in enhancing the individual’s or community’s non-material quality of life.

Broadly speaking the six kinds of value listed here can be related as follows to the two categories of common/public and private good:

**Common/public good**

- (a) Instrumental value
- (c) Accumulative value
- (d) Educational value
- (e) Cultural value
- (f) Transcendent value

**Private good**

- (b) Competitive value

Knowledge that is of value in service of the common good needs to be disseminated widely and without hindrance. Knowledge that is of value in service of the private good will be jealously guarded. The problem is that the same knowledge often has more than one type of value. The tension between the competitive value of

knowledge and its other values is by no means new, but in our time this tension has been exacerbated by various factors.

For several centuries, starting with the Statute of Anne in England in 1710 (Copyright 2004) the North has had a system of intellectual property that sought to balance incentives for authors, inventors and creators of all kinds with the promotion of knowledge for the common good (Agha 1997). IPR were part of a balancing act between public good and private greed. This also applied to the production and dissemination of scientific knowledge. On the whole, scholars have conducted research and produced knowledge without direct regard for financial benefit, being primarily compensated by establishing priority of discovery, peer recognition, scientific prestige, academic tenure and the like. For that reason they desire that their contributions should be widely disseminated, with as few obstacles as possible. These desires largely coincide with those of their readers (Bronmo 1997).

Although copyright has been seen as a “bargain” between creators and the public, or authors and readers (Agha 1997), intellectual property is mainly owned by corporations, not by the authors, artists and composers who created the works (Hamelink 2000). The rights of creators have faded into the background and such financial rewards as there are, are reaped by the middlemen and disseminators. In the context of scholarly information, journal publishers are the most prominent group of middlemen.<sup>5</sup> To stay in business publishers must cover their costs and make a profit. Hence dissemination of scientific knowledge carries a price tag. Generally, based on the mutual understanding of the preservation of the information commons where the economic and the moral dimensions of information production and distribution are in balance, it has been assumed by both authors and readers that the price tag should not be such that it inhibits access. The publications should be affordable, if not by individual academics and students, then by libraries which can subscribe to journals and buy monographs in order to make them available to their clientele free of charge. Because more and more major publishers no longer share this commitment to the information commons, this is becoming more and more difficult. The institutions, such as the universities, which employ scholars are forced to pay many times over for the intellectual property generated by their own employees largely at the expense of the institutions and their governments. Typically a university has to pay:

- ?? Page charges for the placement of articles in the journals
- ?? Subscriptions to the journals for the university library
- ?? For the photocopying licence to enable them to make copies for teaching purposes
- ?? For clearance to include the same material in study packs (Consortium of University Research Libraries 2003)

The problem is compounded by the nature of the product. Each intellectual product is unique. If a researcher needs an article by Smith on topic X, an article by Smith on topic Y or an article by Jones on topic X will not do. Thus the publisher holds a *de facto* monopoly. The law of supply and demand does not work in such cases. That this is not mere speculation is demonstrated by the well-known phenomenon that the increase in journal prices has consistently outstripped inflation in the countries of origin. For example, in the USA the Association of Research Libraries (ARL) reported in 2002 that serial prices had outstripped inflation for almost two decades (Kyrillidou & Young 2002); in the UK there was a 291% increase between 1986 and 2000, while the Retail Price Index in that country rose by approximately 75% (Consortium... 2003).

Thus, while a quasi-symbiotic relationship may have existed between authors, journal publishers and readers in the past, in recent times the relationship between journal publishers and authors/readers has become increasingly troubled. Today it seems that publishers on the one hand, and scientific authors and readers, on the other, inhabit two different spheres, each with its own value system: respectively that of free market capitalism and that of the common good. Until relatively recently these two spheres were in balance. More recently, since the early 1990s (Drahos 2003), the balance has been disturbed by a number of factors:

First, publishing has become big business globally. Gone are the days of gentlemanly scholar-publishers prepared to cross-subsidise loss-making titles in the public interest. Take-over upon take-over has occurred. It is difficult to keep track of who owns whom. The result is that many publishing houses belong to huge corporations with diverse business interests. In many cases these are multinationals. Their publishing holdings, sometimes acquired almost unintentionally as part of larger deals, may be

minor compared with their other business. The bottom line for the publishing subsidiaries is profit or perish.

Second, the commodification of knowledge: a great deal has been written about the post-industrial society (Bell 1976), the information society (Naisbitt 1982, Webster 1995), the information economy (Freeman & Louça 2002), the knowledge society (Steward 1997) and the like. It may be that the change is not as revolutionary and the transition not as discontinuous as it has widely (and often wildly!) been depicted (Hamelink 2000). But there is widespread acceptance that information (or rather knowledge) is the dominant strategic resource of this new era, comparable to land in the agricultural era and to capital in the industrial era. This means that knowledge has commercial value, and gives rise to competition. Knowledge becomes a commodity (Lyotard 1984).

Third, the impact of digital technology: digital technology at first sight appears to be the answer to the cost spiral that characterises conventional publishing technologies, by reducing set-up costs as well as marginal costs. In this way it seems to make possible dissemination at close to zero cost. In practice this has not happened. The set-up costs of electronic publications do not differ much from those of printed publications. There may be some reduction in marginal costs, but the savings may be illusory as some cost elements (e.g. those relating to ICT infrastructure) are passed on from publishers to users (Summerfield 2004). However, digital technology also makes possible a much greater degree of control by publishers. Whereas publishers of print journals have very little control over who reads a given print journal issue once it has left their warehouses, publishers of electronic journals can use digital technology to monitor and limit access on a article-by-article basis. The monitoring of who reads what is in itself disturbing. Limiting access can artificially increase scarcity value. It is also in conflict with the values of authors, who are motivated to reach as wide a readership as possible. The possibility of charging clients a fee every time an article is downloaded has led to the realisation that out of print and backlist material still has commercial value. Not surprisingly we are seeing the focus of journal publishers shift from the journal as a unit, to the individual article as the sellable commodity.

A chemical equilibrium is a highly unstable state. So too is the balancing act described here. How do we respond if it is out of kilter? We believe that some moral guidelines may be useful. A brief excursus on a possible moral framework follows.

### **Moral principles: human rights and social justice**

In a recent article (Britz & Lor 2003b) we have argued the need for a moral framework and a common vocabulary for dealing with the moral questions arising from phenomena observed in the South-North flow of information. Here we contend that this framework applies also to North-South and South-South information flows, i.e. to the flow of information between the countries and regions of the world generally. Three moral claims form the basis for this framework: They are that: (i) there are universal information related human rights; (ii) there is a common good that consist of those things that society shares to everyone's benefit; (iii) social justice is the primary tool that must provide the moral standard for assessing a society. These three moral claims are elaborated upon in that article. Here they are outlined briefly.

#### *Universal human rights*

Based on the moral theory of Rawls (1973) it is argued that social justice forms the basis for moral reasoning. However, a precondition for justice is the recognition that all human beings are fundamentally equal and free and have intrinsic human rights as well as the freedom to exercise them. Rawls (1973:60) formulates it as follows: "Each person is to have an equal right to the most extensive basic liberty with a similar liberty to others". Based on the assumption that information is a basic resource in any society that needs to survive and develop it can be argued, in line with Drahos (1996:155), that certain basic information rights (as an expression of Rawls's basic liberty) can be distinguished. These are:

?? The right of freedom of expression and access to the information that is needed to exercise all other basic rights. The right of *access to information* is a positive right and correlates with the duty to share knowledge with others to enable them to exercise their basic rights (Britz 1998: 11). As such it is an expression of the moral principle of autonomy, which enables individuals to shape their own lives. The right of *freedom of expression* relates to both the negative and positive liberty

of individuals and groups – the right not to be interfered with (negative) and the right to express opinions and receive information (positive).

- ?? The right to communicate. This is a more recently developed right and implies the right of communities and nations to share their views and to learn from others. Hamelink correctly points out that we should move beyond ‘information and knowledge societies’ towards ‘communication societies’. This right to communicate is essential in the globalise society in which we are living because “globalisation without dialogue becomes homogenisation and hegemony. Localization without dialogue becomes fragmentation and isolation” (Hamelink 2003).
- ?? The right of individuals and groups to use and control information that they have generated themselves. The exclusive right to ownership of information, which forms the basis for IPR, is excluded as a basic natural right. It is rather viewed as a secondary economic-based right that can never override the right of access to essential information (Drahos 1996:14).

These rights are however *prima facie* and conditional and therefore not absolute. One can, for example, exercise these rights only insofar as they do not interfere with the rights of others.

### *Common good*

Although human rights are seen as the basis for morality, the notion of a common good is also of vital importance for reflection on world information flows. It is concerned with certain values that are shared by a moral community. Shared values relevant to world information flows are the striving for mutual understanding, respect for one another (based on the acknowledgement of others’ rights) as well as the creation of harmony. The common good can be maximised by the sharing of knowledge on an equal basis between the regions of the world, thereby creating mutual understanding. This implies that the gap between information rich and information poor, which is reinforced by the digital divide, is immoral.

### *Justice*

Justice is the main normative tool that can be used to regulate world information flows. A fourfold typology of justice is put forward that can be used to ensure a fair and just South-North flow of information. In this typology, which is based on the United States National Conference of Catholic Bishops pastoral letter on social

teachings of 1986 (republished in 1997), as expanded by Britz (1996), four interrelated types of justice are distinguished: commutative justice, distributive justice, contributive justice and retributive justice.

- ?? Commutative justice requires “fundamental fairness in all agreements and exchanges between individuals or social groups” (National Conference of Catholic Bishops 1997: 42). Applied to the South-North flow of information it means amongst others that South-generated knowledge may not be taken and used without the consent and fair compensation of the South.
- ?? Distributive justice takes as its starting point the fair and equal distribution of the resources that people need for their survival and well-being and implies that there should be some degree of equity in respect of material well-being, as in the right to health, sanitation, clean water and food security. In the context of information flows this implies the fair and equal distribution of information needed for survival and well-being as well as to enable mutual understanding. It is on the basis of distributive justice, for example, that the countries of the South have a moral claim to inexpensive generic anti-retroviral drugs to treat HIV-AIDS patients, and to investment in research on an anti-Malaria vaccine by the pharmaceutical companies of the North that have so far neglected this field because the commercial returns are not promising. However, this form of justice may allow the unequal distribution of certain categories of knowledge (Rawls 1973:64); for example knowledge that is protected under intellectual property regimes, such as trade secrets, with the proviso that such unequal distribution of knowledge is only justified if it is to the benefit of the common good.
- ?? Contributive justice has a bearing on individual as well as social responsibilities. It implies that an individual has the responsibility to be active in society and to contribute in a positive manner to the achievement of the common good. Society has a duty to facilitate these individual activities without impairing the freedom and dignity of the individual. On the one hand, individuals have the responsibility to create knowledge that must benefit society. On the other hand society has the obligation and duty to ensure that the infrastructure is in place to provide individuals with the means to create and distribute knowledge and to ensure that they receive a fair economic return on their efforts. Applied to the South-North flow of information it implies not only that African scholars have a duty to contribute their findings and insight to humanity generally, but also that the international systems of scholarly communication should be hospitable to their contributions.
- ?? Retributive justice provides an enforcement component. It spells out clearly what constitutes non-conforming behaviour and provides for the fair punishment of those who have violated society’s accepted principles of justice. In the context of North-South, South-North and South-South information flows it implies that legal mechanisms should be in place to protect the rights of knowledge producers, holders and users, covering not only the conventional intellectual property of North and South, but also the rights of traditional communities of the South in respect of their indigenous knowledge and cultural heritage resources. These include the moral rights of communities to be recognised as the creators of their cultural heritage, and the protection of this heritage against unilateral, insensitive

and exploitative utilisation. This also implies the protection of the right to access their own knowledge, once produced and distributed in the marketplace.

### **North-South: Your money or your life**

We have already pointed out that the balance between the capitalist and common good approaches to access to knowledge has been disturbed. The situation sketched above has been compounded by the effects of globalisation and particularly by international developments in respect of IPR. In the last decade there has been a strong trend towards stricter application of intellectual property legislation in the countries of the North. It has been accompanied by moves to extend the term of copyright (in the USA and the European Union), to develop a more restrictive copyright regime for digital media (under the slogan “digital is different”) and to extend copyright to databases of public facts (Bollier 2003; Gross 2003). In so doing IPR owners are attempting to whittle away the “fair use” or “fair dealing” provisions that have long been applied to print media. The extension and stricter enforcement of IPR legislation have been motivated on the one hand by the desire to counter piracy and, on the other, by the realisation that intellectual property is a valuable asset, so that knowledge is seen as a commodity. The wealthy countries, in particular the European Union and the USA have taken the lead in setting international standards to ensure that IPR owners, which are mainly based in the North, receive worldwide protection (Britz *in progress*). Using their economic muscle and the small carrot and big stick approach to prising open the domestic markets of the less powerful countries, they have succeeded in linking IPR with general trade agreements and in establishing a framework for countries around the world to tighten their IPR regimes in accordance with these international agreements (Chang 2003).

The fundamental unfairness of the imposition of these regimes on the South has been voiced by Agha (1997:251)

The arm-twisting imposition of intellectual property rights by developed countries on the developing ones, given their dominant position, is an unfair one. The irony of the situation is that developed countries have, by various means to the disadvantage of the developing countries, take out of those countries the genetic stock of fauna and flora for free, and to their immense benefit, on the assumption that such a resource is to be shared by the world. Should not knowledge and technology also be shared by the world on similar terms?

Two key instruments have been used to shift the balance in favour of IPR owners. The first is the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) of the World Trade Organisation (WTO). The second is the WIPO Copyright Treaty agreed in December 1996 at the Diplomatic Conference held in Geneva (World Intellectual Property Organization 1996; Harris 1997; Von Hielmcrone 2000; Thomas & Lee 2002). The international harmonisation of IPR laws and treaties is worrying because it places ever more power in the hands of large multinational IT and media corporations while steadily eroding the information commons (Britz *in progress*). Furthermore, it has been argued by Hamelink (2000) that the WTO's policies promote the concentration and consolidation of markets and the forming of oligopolies, which in developing countries leads to the ownership and dominance of media by foreign owners.

Well before these international moves for greater control of IPR and well before the advent of the Internet, scholars and students in the South suffered serious handicaps in keeping up with their counterparts in the North. In post-colonial times, they have been particularly hard hit by the steep increases in the price of material such as scientific journals. Given the unfavourable currency situation and low purchasing power of the South, these materials are in many cases unaffordable in academic and scientific institutions in the South, which have to make do with an ever-shrinking subset of core journals. One might have thought that modern ICTs would help to narrow the divide between information-rich and information poor, but this has not yet happened. Instead, we now have a digital divide, which is growing rather than narrowing (Arunachalam 2003).

It is in the nature of any new technology to exacerbate the existing divide between the rich and the poor. The newer and the more potent the technology, the greater its ability to increase inequalities. The rapid changes taking place in the ways new information is published, stored, disseminated, and retrieved using the rapidly advancing information and communication technologies ... have exacerbated the relative deprivation suffered by researchers in the developing world. (Arunachalam 2003:135).

Arunachalam points out how lack of access to electronic journals (due to financial constraints) makes simple tasks, such as following up references, that a researcher in the North can carry out with a few clicks of a mouse, a time-consuming activity that can take weeks to complete. Similarly lack of access to the Internet makes it very

difficult for researchers in the South to participate in international research projects, to submit their papers to journals, or to take part in the refereeing and editing processes.

The effect of ICTs is not all negative, however. In a spirit of solidarity with scholars in the South, a number of schemes have been devised to assist them in gaining access to the scientific literature. An example is the Programme for the Enhancement of Research Information (PERI) of the International Network for the Availability of Scientific Publications (INASP). PERI comprises, among others a scheme whereby institutions in the poorer countries of Africa can gain access to current awareness services and online journals through country-wide access licences negotiated at very favourable prices (Programme for the Enhancement of Research Information 2001). There are various other schemes by publishers and journal aggregators to provide special deals and even gratis access for the poorest countries of the South, for example the African Virtual University and the Health Internetworking Access to Research Initiative (HINARI) (Arunachalam 2003).

A further encouraging development is the open access movement, including peer-reviewed open access journals, e-print repositories, and institutional repositories (Björk 2003; Consortium... 2003; Smith, et al. 2003; Tennant 2002). The movement encompasses a variety of initiatives by scholars, research libraries, research foundations, public interest institutions and various consortia and coalitions of these. This movement can be seen as a reaction and resistance to:

- ?? restrictive IPR regimes
- ?? the skewed relationship between publishers on the one hand and authors, their employing institutions and readers on the other
- ?? the perceived predatory pricing and licensing strategies of certain major publishers, particularly in relation to the pricing of parallel print and electronic versions of journals
- ?? continually rising subscription costs

The open access movement has received significant support from the Soros-funded Open Society Institute in Budapest, where a meeting was held in December 2001 to promote progress in international efforts to make research articles in all disciplines freely available on the Internet. A result of this meeting was the formulation of the Budapest Open Access Initiative, a “statement of principle, a statement of strategy,

and a statement of commitment” (Budapest Open Access Initiative 2004). The statement recommends two complementary strategies, that of self-archiving (the deposit by scholars of their refereed journal articles in open electronic archives), and open access journals, which include new journals established on the open access principles and existing journals wanting to make the transition to open access. By February 2004, the statement had been signed by over 3400 scholars and by representatives of other role-players in scholarly communication (Budapest...2004).

The common thread in the various open access initiatives is to persuade scholars to make their research outputs available on the Internet free of charge (or at reduced or minimal cost) and with greatly relaxed copyright conditions. These movements are not necessarily opposed to IPR, but what they have in common is that they strive to open up space for the unhindered dissemination of knowledge generated by scholars for certain categories of use. One example is Creative Commons (2004), a web-based organisation that invites artists, photographers, musicians, educators and scholars who wish to make their work more readily available to others to post it on the Web under conditions that are less restrictive than the standard copyright conditions. Creative Commons has designed a range of licences, under which authors inform readers, viewers or listeners that their work may be freely performed, copied or otherwise disseminated under one or more conditions such as the following:

- ?? authorship is acknowledged
- ?? the integrity of the work is respected
- ?? the work is not used for money-making purposes
- ?? the work is not adapted or incorporated in derivative works
- ?? and various combinations of conditions

The upshot is that the authors retain copyright, but impose less restrictive conditions for the dissemination of their work, in order to make it accessible to a larger audience.

The Public Library of Science (PLOS) is an initiative by scholars. It is a non-profit organisation of scientists and physicians who are “committed to making the world’s scientific and medical literature a public resource”. The organisation’s goals are to:

- ?? “Open the doors to the world’s library of scientific knowledge by giving any scientist, physician, patient, or student – anywhere in the world – unlimited access to the latest scientific research.
- ?? Facilitate research, informed medical practice, and education by making it possible to freely search the full text of every published article to locate specific ideas, methods, experimental results, and observations.
- ?? Enable scientists, librarians, publishers and entrepreneurs to develop innovative ways to explore and use the world’s treasury of scientific ideas and discoveries.” (Public Library of Science 2004)

PLoS aims to publish peer-reviewed journals of high quality, using a new business model that will enable PLoS to make all the published work available online immediately, free of charge and without restrictions on re-use. Essentially, the journals will be financed by the imposition of a modest charge per article published. This is to be paid by the authors or their sponsoring organisation. The charge will be reduced or waived in the case of authors (such as those from the South) who cannot afford to pay. The initial issue of its first journal, *PLoS biology*, was published in October 2003; *PLoS Medicine* was to follow shortly thereafter (Public... 2004). The PLoS web site, at <http://www.plos.org/about/index.html>, is worth visiting, since it also provides a definition of open access and background on the open access movement.

Other examples are the International Scholarly Communications Alliance (ISCA), the Scholarly Publishing and Academic Resources Coalition (SPARC) and BioMed Central (Arunachalam 2003; Consortium... 2003). From the point of view of North-South information flows, these initiatives provide scholars and students in the South with free or relatively affordable access to the world’s scientific and scholarly literature. At the same time, the initiatives also open up new possibilities for the South-North and South-South flow of information.

### **South-North: does charity begin at home?**

It seems hardly necessary to state that African societies, communities and scholars have much to contribute to a humane world. By a humane world we mean a world in which cultural diversity and different modes of imagining and knowing are not merely tolerated, but appreciated and encouraged. Their suppression in order that all knowledge and understanding can be fitted into the straitjacket of a dominant western

world-view is also an impoverishment of the wealthy nations. These nations should be as concerned about the disappearance of indigenous knowledge, arts and culture and languages spoken by small groups of people, as they are about the reduction of biodiversity. Western governments and pressure groups campaign for the preservation of tropical rain forests and other biomes in the South, inter alia to combat the loss of biodiversity. But comparable efforts are not made to prevent the extinction of languages and cultures that are bearers of unique knowledge.

Over the centuries Africa has been exploited in various ways, including the wholesale plundering of Africa's human resources in the slave trade and the exploitation by colonialists of Africa's mineral resources, genetic diversity, and cultural treasures. Today the exploitation of Africa's indigenous knowledge<sup>6</sup> has come to the foreground. This knowledge, the product of millennia during which African communities came to terms with and adapted to their often harsh environment, was initially disregarded as unscientific folklore. Today, bio-prospectors are visiting rural communities, making friends with the "locals", questioning them about their use of plants in traditional medicine, and taking samples back to the North where the active constituents are isolated in the laboratory and then patented.

An example: The San (Bushmen) in the Kalahari know of a succulent plant (*Hoodia gordonia*) that relieves hunger pangs and allows them to carry on during a hunting expedition even when they have had nothing to eat for some time. The South African CSIR identified the active constituent of *Hoodia* and was in the process of patenting it and making a deal with two foreign pharmaceutical companies, Phytopharm (UK) and Pfizer (US), to develop an appetite suppressant prescription drug. This was done without informing or consulting the San. The Working Group of Indigenous Minorities in Southern Africa (WIMSA), a San-owned regional networking organisation learned of this in 2001 and alerted the San. The South African San Council was then appointed to negotiate with the CSIR. When the story appeared in the media, public pressure helped to force the CSIR to negotiate with the San. Ultimately an agreement was reached in terms of which the San will receive a modest share of royalties on sales of the drug (Geingos & Ngakaeaja 2002; Wynberg 2003).

It is easy to respond to this type of situation with righteous indignation. Among the emotional responses to biopiracy and the misappropriation of African indigenous knowledge for selfish commercial purposes may be a defensive approach: to shroud it, as far as possible, in secrecy, so that it cannot be misappropriated and exploited by the North. This is not entirely irrational, since indigenous knowledge has ritual and spiritual dimensions and is imbedded in its cultural and religious context. To share this knowledge with others who do not share the context and ethos of the community that created the indigenous knowledge, entails risk (cf. Nakata 2002). In addition to the risk of commercial exploitation, there is a risk that the knowledge may be dealt with out of context in an insensitive and disrespectful manner. One thinks of the popular depictions of traditional healers as “witch-doctors”, or of the way the Maori *haka* has been trivialised by New Zealand rugby teams.

But righteous indignation is not a very constructive attitude. Secrecy is not the best way to deal with indigenous knowledge. Knowledge has a tendency to spontaneous diffusion. Things that are hidden invite investigation by the curious. Scarcity adds to the market value of information, so that those entrusted with the secret may be led into the temptation to reveal it by the offer of financial reward. If the secret is discovered accidentally, it will be all the more difficult for the originating community to patent or copyright it. These are pragmatic arguments. There is also a moral argument, based on the principle of contributive justice, referred to earlier. If the secret remains hidden, how can other communities in the country of origin benefit? Contributive justice entails that, in the interest of humanity, communities and nations should be prepared to share their knowledge with the rest of the world.

“Sharing” indigenous knowledge is not a simple matter. There are significant problems in recording indigenous knowledge and processing it so that it can be retrieved using global information systems (Meyer 2003). But these problems are technical. To speak of the “globalisation” of indigenous knowledge begs more difficult moral questions, such as:

- ?? Who may gain access to the recorded indigenous knowledge?
- ?? Does the community that originated it have any say in who gains access?
- ?? May indigenous knowledge be exploited for commercial gain?

- ?? Does the community that originated it have any say in the exploitation of the knowledge?
- ?? Does the community that originated it have a right to compensation, or to a share of the profits?

Similar questions arise in respect of other forms of knowledge or information that is exported to the North, such as digitised collections of African heritage materials (Britz & Lor 2003a) and the export of African heritage materials such as rare books, writers' archives, traditional artefacts and works of art, etc. (Britz & Lor 2003b). Means must be found to protect African intellectual property, while at the same time contributing it to humanity. These means could include national legislation specifically protecting indigenous knowledge, the inclusion of indigenous knowledge in legal deposit legislation (Lor 2002) the use of model contracts binding on bioprospectors and others wishing to record indigenous knowledge, and the utilisation of various components of the international intellectual property regime (copyright, patents, trade secrets, trade marks, etc.), adapted as necessary for the special characteristics of indigenous knowledge (Lipinski & Britz 2001). Such measures are preferable to protectiveness and secrecy, which will tend to ghettoise Africa's achievements. Africa should share its knowledge resources with the world, judiciously and proudly.

Africa's knowledge resources include research contributions by African scholars. Here the problem has not been to prevent the dissemination (whether acknowledged or not) of African knowledge resources to the North, but rather to promote dissemination and specifically to cross the significant barriers that impede South-North information flow. Apart from the difficulties that scholars of the South face in gaining access to information resources from the North, there are barriers of disinterest and prejudice to be faced:

Inadequate access to literature or information is not the only problem faced by scientists in developing countries. An equally important problem is that research conducted in developing countries lacks visibility. Nobody notices it. Nobody quotes it. It gets buried in an obscure corner of the world output of literature. (Arunachalam 2003:137)

African authors who wish to publish locally face the problem that there are not many African scholarly journals of good quality, and the number is declining. Many are poorly run and edited and appear irregularly, so that libraries in the North do not want

to subscribe to them (Rosenberg 2002). Omekwu (2003:132) states that journal publication in Africa is “highly unsustainable”. The journals lack a steady subscriber base and are financially insecure. Marketing is minimal and distribution is poor. Many lack a consistent supply of articles (Omekwu 2003), possibly because of a tendency of authors to seek publication in more prestigious titles published in the North (Britz & Lor 2003b).

If an African scholar does succeed in having his/her work published in a national or regional (African) journal, it may simply be ignored (Gibbs 1995; Britz & Lor 2003b). Readers in the North may simply dismiss articles from the South as not worth reading, or if they seek to read them, they may find it difficult to gain access to the journal in which it is published.

As stated earlier, the principle of contributive justice implies on the one hand that African researchers and scholars have a duty to contribute their findings and insight to humanity generally, and on the other, that the international systems of scientific and scholarly communication should accept their contributions. Internationally, interest in this problem has grown in the last decades, and a number of schemes can be mentioned that make it easier for African scholars to make their contribution to the world (Arunachalam 2003; Britz & Lor 2003b).

One of these is African Journals On-Line (AJOL), a project of INASP. This scheme initially made the tables of contents of 15 English-language scientific journals published in Africa available on-line and provided a fee-based article delivery service. It has in the mean time been expanded to make over sixty titles, including French-language and South African journals available on the Internet (International Network for the Availability of Scientific Publications 2004). Other initiatives aimed at making African journals more readily available world-wide using the Internet include the African e-Journals Project (AEJP) of the African Studies Centre at Michigan State University (African e-Journals Project 2004) and the inclusion of a number of African biomedical journals in the Bioline full text service (Bioline International 2004; Rosenberg 2002).

Hope is not only offered by these initiatives, which aim specifically to improve the North's awareness of and access to the knowledge production of the South. The open access initiatives referred to in the previous section also facilitate the dissemination of knowledge created in the South. Given adequate computer workstations, Internet connectivity and sufficient bandwidth, African scholars can also submit their articles for refereeing and publication in open-access electronic journals such as those of PLoS. As was pointed out, the business model of initiatives of this kind relies on a contribution from the authors or their institutions for each article published electronically, but it has also been indicated that such charges will be reduced or waived in cases where the authors or their institutions cannot afford this. African scholars can also post their refereed articles on appropriate e-print archives. African universities can establish functional digital institutional repositories at a fraction of the cost of maintaining a conventional university press. Some universities in South Africa have already embarked on this; no doubt this is also happening elsewhere in Africa. To the extent that search engines are unbiased (which is not to be taken for granted) the WWW is unbiased in providing access to sites regardless of where they are located.

Discussing the various modalities of dissemination, Arunachalam (2003: 138-143) makes a number of recommendations to authors of the South:

- ?? Scientists everywhere, and especially in developing countries, should make every effort to publish their work in, and give their full support to, those journals that have adopted the [open access] policy proposed in the open letter [to publishers, circulated by scientists].
- ?? Scientists from developing countries should submit their work to SPARC journals rather than to the expensive journals they are trying to replace. [SPARC encourages editorial boards of excessively expensive journals to start competing journals of high quality that can be published at much lower cost.]
- ?? Developing country scientists should use the existing [open full-text or e-print] archives to disseminate their work as well as to learn about the work of others. They may also establish institutional archives and national e-print servers, especially in fields such as agriculture and health sciences...
- ?? Scientists from developing countries should encourage all journals to join ... efforts [such as PubMed Central, a digital archive of life sciences journal literature].

Scholars are both producers and consumers of knowledge. Arunachalam reminds us that in our capacity as producers of knowledge, we need to take into account the needs of its consumers. For every article a scholar writes, many more are first read. Scholars also have a responsibility to the institutions that employ them, to select

publishers and publishing modalities that are in the long-term interest of their institutions, for example by selecting publishers that allow them to make multiple copies of their own articles for educational use.

### **South-South: do good fences make good neighbours?**

It is often overlooked that the South-North flow of information is critical to the South-South flow. This is because much of the knowledge produced in the South is published in the North, and because discipline-wide bibliographic control is also largely based in the North. Since bibliographic control is poorly developed in the countries of the South, we have to rely on bibliographic databases produced in the North. Similarly, resource-sharing systems such as interlending schemes are poorly developed in African countries. In many cases it is much faster and more certain for an African library to obtain a copy of an article that was written or published in a neighbouring country from the British Library at Boston Spa than from the capital of that country.

Ideally African countries should reduce their dependence on the information infrastructure of their former colonial rulers by improving national bibliographic control and developing regional resource-sharing schemes. This is unlikely to happen soon. In most African countries national bibliographic control leaves much to be desired. Often legal deposit legislation is out of date and largely ignored by publishers. The national publishing and bookselling industry may be poorly organised. National bibliographic agencies frequently lack the resources to operate national bibliographic services on an on-going basis (Omekwu 2003). If the production of scholarly literature is not recorded, it becomes almost impossible to identify and locate existing information resources in response to information needs. Even knowledge produced in one's own country is inaccessible.

The prospects for regional resource-sharing schemes are poor if, at the national level, there are few resources to share, and few resources to operate resource-sharing systems. It comes as no surprise that interlending is poorly developed in many African countries. Ironically, resource sharing seems to flourish most in well-resourced countries. An ethos of sharing is difficult to cultivate when there is little to share. Unreliable transportation and telecommunications infrastructures also inhibit resource sharing.

All is not gloom, however. During the past decade there has been a significant improvement in Internet connectivity. As more material is being published electronically (born-digital), as more print and other analogue material is digitised, and as more band-width is made available, some of the barriers to resource-sharing fall away. Prospects are best, at least initially, for sector-specific resource-sharing systems of limited scope, such as DATAD, which covers a clearly defined and relatively homogeneous category of material.

The political environment is also more favourable today than it has been in the past. Will the library and information sector be able to hitch a ride on the African Renaissance bandwagon? To support NEPAD? To be recognised as a portfolio of the African Union? Our track record in generating enthusiasm at government level is not good. Yet the terms “renaissance”, “partnership” and “African century” all evoke concepts that favour an awareness and appreciation of Africa’s knowledge resources and the continent-wide sharing of knowledge. There is a challenge to our profession to seize the opportunity.

### **Application to theses and dissertations**

In the introduction to this paper we promised to consider the implications of general moral principles for the electronic storage and dissemination of theses and dissertations. The following are some issues and guidelines:

**Commutative justice** requires fundamental fairness in agreements and exchanges between parties.

With respect to South-North information flows, South-generated knowledge as set forth in theses and dissertations may not be appropriated by the North without the consent and fair compensation of the South. This is an issue of IPR, which may be complicated by a number of factors. Two questions arise: whose intellectual property is it, and has it any commercial value?

Who is the holder of the intellectual property? The author as creator of the knowledge is the natural holder. However, in the case of a thesis or dissertation, the

student may be required by the university to sign away his/her copyright. It may be argued that this is a fair exchange: the university provides tuition, guidance and infrastructure, which enable the student to produce a report and ultimately to receive a degree. In exchange for this, it may be argued that the university should hold the copyright. However, in light of the principle of commutative justice, we need to consider whether the power relationship between the university and the student is such that the student can freely enter into such an agreement. If the university holds a monopoly on degrees and if the student, at the outset, is not aware of what he/she is signing away upon enrolment, this may be construed as unfair. A further factor to take into account is the extent to which the student had to pay for the services provided by the university. Of course, in many cases tuition costs are heavily subsidised by the state.

A complicating factor arises in post-graduate research when the student makes use of informants and information from local communities. Can the student or the university in fairness claim IPR over a report that relies heavily on indigenous knowledge or even on data collected with the cooperation of a given non-traditional community? Commutative justice requires that the researcher may not take advantage of the ignorance or lack of sophistication of such a community. Prior consent must be obtained and fair compensation must be made for the community's contribution. Depending on the nature of the contribution made by the community, compensation might take the form of a simple debriefing or feedback session, a community problem-solving workshop, assistance with a community development project related to the topic of the study, the development of a commercial undertaking that will provide an income for community members, or royalties on the sales of a product developed on the basis of information that the community provided. The compensation should be fairly negotiated. A serious lack in the current IPR regime is that it does not make provision for the acknowledgement and, by implication, fair compensation of communal IPR. This has led to the exploitation of the communally owned knowledge of indigenous peoples.

Commutative justice also requires that the issue of who owns the resulting IPR should be agreed up-front with the student, with all the cards on the table. Furthermore, it can be argued that the student should be afforded an opportunity to participate in any

enterprise that may arise from the research work, and share in any profits from it. In relation to DATAD specifically, the requirement is that students should be informed at the outset that their theses and dissertations will be added to an electronic database, and will be made available for use. The student has the right to know what kinds of use will be permitted and what categories of users will be allowed access.

**Distributive justice** is concerned with the fair and equal distribution of resources needed for survival and well-being. If the research leads to the development of improved agricultural practices, health care, sanitation, building methods etc., this implies that the knowledge that was gained should be shared: with the community where the research was carried out, with other communities in the country, with other countries in the South, and with the North, depending on the scope and impact of the research, and on the nature of the needs that the results can address. This moral obligation is an expression of the right to communicate, which has been identified as one of the basic preconditions for social justice. Certain knowledge may be protected under intellectual property regimes, giving rise to unequal distribution. This can be justified if it is in the general interest. For example, the research may lead to the granting of a patent to the university. The university stands to receive royalties that will enable it to provide a higher standard of education and enhance its research capacity for the benefit of the country. This has to be weighed up against the common good. The answer would differ depending on how critical the benefits are and on the size of the group affected. For example, one would expect different decisions in respect of a chemical substance that ensures whiter teeth compared with one that can be used to treat a life-threatening disease.

**Contributive justice** implies that both the university and the student have an obligation to be active in society and contribute to the common good. This has implications for the nature of the research undertaken. Further, there is a moral obligation to disseminate any knowledge that may benefit society. Universities should require their research students to include plans for the dissemination of research results as part of their research proposals, and should ensure that these plans are carried out before the degree is awarded. The universities themselves should have public education and communication programmes in place to ensure that research results are disseminated for the common good. (This does not preclude measures

taken to ensure a fair economic return, in so far as this is compatible with the requirements of commutative and distributive justice.) Furthermore, the universities have an obligation to provide appropriate long-term access to the theses and dissertations of their students, which implies a responsibility for their long-term preservation.

This also applies to the South-North flow of information. Universities in the South cannot refuse to contribute their knowledge to humanity as a whole (again, subject to fair compensation as appropriate). On the other hand scholarly institutions in the North have a responsibility to provide mechanisms for the efficient dissemination and fair evaluation of theses and dissertations from the South. This includes providing feedback in the form of peer evaluation of African research outputs and devoting time to serving as external examiners of African students. This will enable the universities of the South to measure themselves against other institutions. Concomitantly, bibliographic control agencies in the North (such as abstracting and indexing services) have a responsibility to include bibliographic entries and abstracts for African theses and dissertations in their databases, so that they can be retrieved and accessed by the world-wide scholarly community.

**Retributive justice** is concerned with sanctions taken in response to inappropriate behaviour. This could be inappropriate behaviour on the part of the student, (such as plagiarism, dishonesty in respect of research data or improper exploitation of research participants), thesis supervisors (for example passing off students' work as their own), and others who have access to the thesis or dissertation. In the context of global information flows, inappropriate behaviour could include failure to respect IPR (copyright, patents, designs, etc.) arising from the research. The international bodies concerned with IPR should exhibit the same alacrity in dealing with violations of the IPR of the South as they exhibit when the multinational corporations of the North complain about "piracy" and the like. Too strict and one-sided application and interpretation of IPR are also unfair behaviour. Measures should be in place to protect the common good as well as the basic liberty of individuals and communities in those cases where the application of IPR is unjust.

## Conclusion

Towards the end of his paper, ‘Ethics and copyright: a developing country perspective’, Agha (1997:256) writes:

The basis of globalisation is interdependence. Interdependence calls for sharing, understanding and tolerance. Knowledge is a tool for human development and progress. The imposition of barriers to access and use [of] knowledge is detrimental to human society. Information is similar to the air we breathe. It should be free. If one sector of society is disadvantaged and poor then ethically it is incumbent on the richer sector of society to respond with generosity and care. Likewise in a global society in this age of globalisation. Inequities between peoples in this interdependent world if allowed to persist will eventually prove to be a greater burden for the richer sector of society.

This is an impassioned and idealistic statement. It largely reflects the principles of social justice as derived from the US National Conference of Catholic Bishops. Social justice provides a useful tool to evaluate the fairness of our current international systems of scholarly communication. It is clear that social justice is not adequately reflected in the international economic and political relations that impact on scholarly communication. However, that should not stop us from imagining and developing systems that *are* fair.

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<sup>1</sup> Also known as the McBride report after its chairman, Sean McBride.

<sup>2</sup> In this paper, the word “South” will serve as shorthand to denote the developing countries that are mainly, but not exclusively, located in the Southern Hemisphere and the lower latitudes of the Northern Hemisphere, while the word “North” will be used to denote the wealthier, industrialised or “developed” countries.

<sup>3</sup> In this paper the word “scholar” is used to refer to academics generally, including scientists, researchers (including the authors of theses and dissertations) and educators across all disciplines, from the natural sciences to the humanities.

<sup>4</sup> Following Farradane (1979) and Britz (2003), we use the term “knowledge” to denote what is known, and “information” to refer to knowledge as it is transmitted externally. Thus knowledge is what resides in the minds of scholars; when it is transmitted in the form of lectures or scientific papers, it is information.

<sup>5</sup> In this paper journal publishers are regarded as typical of the publishing industry as a whole because they are the most significant players in scholarly publishing. Obviously not all categories of publishers -- and not all journal publishers -- can be painted with the same brush.

<sup>6</sup> For a working definition of indigenous knowledge, see the description provided on the web site of the World Bank:

Indigenous knowledge is local knowledge.

IK is unique to every culture or society.

IK is the basis for local-level decision-making in agriculture, health care, food preparation, education, natural-resource management [and] a host of other activities in communities.

IK provides problem-solving strategies for communities.

IK is commonly held by communities rather than individuals.

IK is tacit knowledge and therefore difficult to codify, it is embedded in community practices, institutions, relationships and rituals. (World Bank, 2002)