THE INTERNET: ACHILLES HEEL OF THE CURRENT INTERNATIONAL TAXATION REGIME?

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I. PARADIGM OF INTERNATIONAL TAX REGIME

Taxes on international income are imposed by national tax laws, *id est*, "there is no global body which imposes income taxes; in that sense the term International Tax Law really refers to the tax treatment of international transactions". [1]

In reality International Tax Law is "domestic law rules of a given state applied to cross-border flows, taking into account (or not) that such flows may be subject to taxation in more than one jurisdiction". Every nation has evolved its own taxation system and decides what income is appropriate to tax. Today the globalization of most countries economies have made it imperative to address the international elements in the country's tax base and so countries entering into Treaties with one other based on commercial needs. Such Treaties limit a country's tax jurisdiction and represent the compromises that the two countries have reached in respect of the sharing of the tax base arising out of cross-border transactions.

1 Pg 31-32, Jinyan Li, International Taxation in the Age of Electronic Commerce: A comparative study

The international tax system of a country is an integral part of its income tax system and is developed keeping in mind the country's policy objective. The basic idea, though, is always to draw as much as possible a territorial 'slice' out of the international income 'pie'.[2] Jinyan Li describes it succinctly when she states that "the development of treaty law has been influenced by the aim of minimizing the overlap (and more recently the gap) of territorial circles drawn by competing countries in order to promote cross-border trade and investment".

The model conventions drafted by international organizations (like the UN and OECD) have served as benchmarks for actual Treaties between countries. In as much as they are the source of the actual Treaties between countries that are drawn up, the model conventions are of immense importance to the countries of the world. It must be noted that the Model conventions are for bilateral treaties, which are the most common form of Treaties prevalent in the world today.

History of Permanent Establishment As A Means Of Assigning Taxing Jurisdiction

The concept of permanent establishment developed in the late 19th century in conjunction with the rapidly evolving business climate sometimes referred to as the "second industrial revolution." This period was characterized by increases in business mobility not entirely dissimilar to the recent Internet-influenced changes to the commercial environment. Between 1870 and 1920, capital of "industrialized countries changed from being predominantly circulating capital (working capital) to capital invested in plants, machines, etc. (fixed capital)." This transformation of capital was accompanied by a transportation revolution such as improvements in railroads and steamships and the advent of the automobile dramatically decreased transportation time and cost. While these changes drastically changed fiscal mobility, industrial mobility remained limited to the transportation industry. It appears, therefore, that PE as an international fiscal concept emerged at a time when production factors were relatively immobile"[3].

2 Pg 34-35, Jinyan Li, International Taxation in the Age of Electronic Commerce: A comparative study

3 Arvid A. Skaar, PERMANENT ESTABLISHMENT, 65 (1991)

After World War I, when governments were in dire need of revenue to rebuild their economies, they began to try to tax the earnings of the visiting businessman and the profits of the foreign company on goods sold through him. In the 1920's, the League of Nations addressed the pernicious double taxation of non-resident companies' business profits. Reports submitted to the League of Nations in 1923 and 1925 highlighted a special need for mechanisms preventing double taxation of these profits. In 1927 and 1928, the League of Nations responded to the reports' recommendations with drafts of the Bilateral Convention for the Prevention of Double Taxation, introducing the concept of permanent establishment as a means of allocating taxing jurisdiction among states with a potential claim to taxing rights. Within the traditional economic context of this theory, a material or physical transaction took place if a natural or juridical person developed tangible economical activities in a certain territory for a minimum period of time. This "fundamental structure for international taxation of income announced nearly seven decades ago in the 1928 League of Nations Model Treaty forms the common basis for more than twelve hundred bilateral tax treaties now in force throughout the world."

The permanent establishment rules first promulgated by the League of Nations in 1928 and currently embodied in the OECD' and UN's Model Convention are well situated in source models of taxation. The claim of source countries to tax income produced within their borders is analogous to a nation's long-recognized claim of sovereignty over natural resources within its boundaries. Source-based justifications for taxation also hold that countries have "a fair claim to the income produced within their borders. Foreigners, whose activities reach some minimum threshold, should contribute to the costs of services provided by the host government. This "social contract" view also evokes the cost and benefit theories of taxation which say that taxpayers should pay the state for the cost of state-provided services or in accordance with specific benefits received by the taxpayer. In light of the theoretical bases for the permanent establishment rules, and the emergence of PE in the early twentieth century "when significant international commerce in foreign markets required the creation of a branch or similar physical presence, many tax commentators have determined that "the conceptual basis for allocating taxable income [under the PE rules] was the location of value-creating activity or source of taxable profits.

Challenges to the permanent establishment regime

This basis for the permanent establishment rules was almost immediately tested by the advent of radio and television marketing. Even though radio and television were not easily subjected to direct taxes, since stations' profits resulted from advertising sales rather than direct charges on listeners and viewers, the proliferation of analog media did not significantly challenge the PE rules due to the implicit assumption that consumption consisted primarily of tangible products sold by those advertising merchants. Nevertheless, the increasing mismatch between law and technology continued to challenge the appropriateness of physical nexus requirements like those embodied in the permanent establishment rules.

In 1967, a question of taxing jurisdiction over multi-state business profits reached the United States Supreme Court. *In National Bellas Hess*[4], a case involving a mail order company conducting business in a State where it had no physical presence, the Court reaffirmed physical presence requirements indicative of the broader theoretical justifications for the PE rules. Twenty-five years later, in 1992, the Court re-examined its Bella Hess holding in *Quill Corp. v. North Dakota*[5], another case involving an attempt by a State to tax the mail order profits of a company with no physical connection to the State. In Quill, the lower court declined to follow Bellas Hess because innovations of the prior quarter century rendered its holding "obsolete"[6]. While the majority reaffirmed its Bellas Hess holding, Justice White noted in his dissent that "in today's economy, physical presence frequently has very little to do with a transaction a State might seek to tax. While Justice White expressed the minority opinion of the Court in Quill, his argument that physical presence had little meaning for taxing jurisdiction seems to be echoed by a majority of contemporary tax scholars.

The change with the greatest impact on traditional taxation structures has been the development of the Internet, "a decentralized, global, and rapidly evolving network that often transmits intangible goods and services and is highly resistant to traditional forms of government regulation." In 1996, The United States Treasury office commented on the changing commercial environment: Electronic commerce, on the other hand, may be conducted without regard to national boundaries and may dissolve the link between an income-producing activity and a specific location. From a certain perspective, electronic commerce doesn't seem to occur in any physical location but instead takes place in the nebulous world of "cyberspace." Persons engaged in electronic commerce could be located anywhere in the world and their customers will be ignorant of, or indifferent to, their location. Given the "nebulous" nature of cyberspace, many commentators have noted how e-commerce fundamentally challenges physical presence-based permanent establishment rules. If permanent establishment principles are to remain effective in the new economy, the fundamental PE components developed for the old economy — place of business, location, and permanency — must be reconciled with the new digital reality. Perhaps the greatest difficulty of applying traditional permanent establishment principles in the e-commerce sense is finding a component of the Internet the effectively meets the OECD Model Convention's requirements for PE status. In 2000, the OECD responded to this major impediment to the use of traditional PE rules in the Model Convention, and made changes to the Convention's Commentary on Article 5.48. This revised Commentary clarifies key issues about how indistinct or difficult to understand Internet components should be considered under current PE principles. While the OECD has responded to the questions posed by the digital economy through changes to the Model Convention's Commentary, they have stopped short of modifying the current PE system and have advocated that the traditional PE concepts will adequately respond to the evolving modern economy.

4 Nat'l Bellas Hess, Inc. v. Dep't of Revenue of Ill., 386 U.S. 753 (1967).
5 Quill, Corp. v. North Dakota, 504 U.S. 298 (1992).
6 North Dakota v. Quill Corp., 470 N.W.2d 203, 208 (N.D. 1991)

The limitations of the prevailing OECD Model

The OECD Model does not define "fixed place of business," the crucial point in determining whether a non-resident's activities in a host jurisdiction are sufficient to create a permanent establishment. Accordingly, the term has been applied according to legal doctrine, case law, and revisions to the OECD Commentary since its inception. These interpretations allowed the "fixed place of business" terminology to adapt to changes occurring in the traditional business world, but Internet-based influences in the modern economy have resulted in hermeneutic confusion.

Existing taxation source rules based on the 'character of income' and the 'geographic origin or location of income' is significantly tested by cross-border trade and services involving two or more locations. The intangible nature of digitized goods and services means that the source jurisdiction may not be able to monitor the tax base (and determine from what and where the income arose) and collect the appropriate amount of tax on profits derived from electronic commerce. This article examines the challenges and opportunities the Internet presents as electronic commerce grows, looking at issues such as the difficulty of characterizing the nature of payment and establishing a 'nexus' or link between a taxable transaction, operation or activity and a taxing jurisdiction, and the difficulty of locating the transaction, operation or activity and identifying the taxpayer for income tax purposes. A tax authority must be able to identify the correct taxpayer and the jurisdiction within which a business operates in order to impose tax effectively.

International Taxation of Internet Commerce

The Internet is a disruptive medium; it has completely changed the way the world works by changing how information is exchanged and business is transacted. Physical limitations, which have long defined traditional taxation concepts, no longer apply and the application of international tax concepts to the internet and related e-commerce transactions is problematic and unclear.

Richard Bird and Scott Wilkie argued that "the old rules of the international tax game....decreasingly serve to carve up the international tax base in a reasonable and sustainable way".[7] It is widely believed that electronic commerce does not create new problems in international taxation, it is exposing all the old problems more quickly at a global level[8].

In short, unless the international taxation concepts are rethought in the light of technologies which are not only emerging but used by a large body of people today, there will be, as David Forst says, precious few black-letter rules specifically tailored for electronic commerce[9].

7 Pg 90, Richard Bird & Scott Wilkie, "Source vs Resident Based Taxation in the European Union: The Wrong Question?" in Sijbren Cnossened. Taxing Capital Income in the European Union: Issues and Options for Reform

8 Pg 2332, Althea Dressel and Robert Goulder, "IFA Asia Regional Conference Focuses on E-commerce and International Taxation" (2000) vol 21, no 21 Tax Notes International 2331-35 (quoting remarks by Noshir Kaka of India)

9 Pg 711, David L. Forst, "Old and New Issues in Taxation of Electronic Commerce" (1999) Vol 14, No. 2 Berkeley Technology Law Journal (pages 711-19)

The current debate about international taxation of e-commerce focuses mainly on feasibility challenges. The challenges are debated solely from a tax law perspective, using technical tax law arguments. This debate has suggested several responses to deal with e-commerce taxation challenges. The difficulty, though, is how to identify the tax base, measure its size, allocate it jurisdictionally and enforce tax liability when who is buying, who is selling and where all this is taking place may all be, in an almost literal sense, up in the air. In a nutshell: How does one mark territory in a seamless, digital world? How does one map nations and taxing jurisdictions in a world that is not based on geography? This throws the application of tax laws into disarray.

Currently, there are four main school of thoughts: (1) that the international regime clarify income-classification rules and consider servers as permanent establishments; (2) that the regime apply a one-source rule, demand jurisdiction, to all e-commerce income; (3) that the regime apply formula taxation; and (4) that the regime exclusively apply residence based taxation (personal jurisdiction) to e-commerce.

Clarifying Income-Classification Rules and Considering Servers as Permanent Establishments

The OECD started the discussion on e-commerce taxation in 1997 during the Turku Conference. In 1998, the Ottawa Taxation Framework was designed and approved. The leading principle of this framework is as follows:

> *"The taxation principles that guide governments in relation to conventional commerce should also guide them in relation to e-commerce.... Existing taxation rules can implement these principles. The application of these principles to e-commerce should be structured to maintain the fiscal sovereignty of countries, to achieve fair sharing of the tax base from e-commerce between countries and to avoid double and unintentional non-taxation."*

Following Ottawa, five Technical Advisory Groups (TAGs) continued the research and dialogue. Their work resulted in several reports on different issues of e-commerce taxation challenges. These reports suggested explanations and clarifications to several principles and concepts of the current international tax regime. The primary challenges the TAGs addressed were income classification and permanent establishment.

As to income-classification issues, a set of clarifying examples and rules was added to the OECD Model Tax Treaty. This set included a large number of technically detailed examples of transactions and the classification of each one. As to the permanent-establishment principle, it was added to Article 5 of the OECD Model Tax Treaty, which stated that a server might constitute permanent establishment as long as it was "an essential and significant part of the business activity of the enterprise as a whole, or where other core functions of the enterprise are carried on through the computer equipment." The OECD view is limited because it ignores cyberspace law perspectives and misses central, important insights that can be brought by wider perspective and open-minded thinking.

The OECD discussion exclusively focused on tax issues and did not pay any attention to cyberspace law literature that dealt with difficulties of regulating the Internet and applying the current law to Internet activity. The OECD discussion also lacked real attention to the normative challenges and acceptability challenges of e-commerce, concentrating only on the feasibility challenges. For all these reasons, the OECD approach is difficult from an analytical point of view and cannot produce satisfying outcomes to appropriately tax cross-border e-commerce income. The OECD approach is still based on the territorial location of the server, a highly irrelevant and mobile factor and one that cannot lead to well-established taxation of e-commerce income. The specific OECD proposals to the feasibility challenges are not likely to lead to successful taxation of international e-commerce income. The clarifications to income-classification rules are arguably so sophisticated that they cannot even be used as a helpful tool in the process of classification. The large number of examples given with many technical and specific details cannot be used as a guiding and useful working tool for tax authorities or for the international business community.

As for the rule of the server as a permanent establishment, it is still a rule that relies on physical location, with all the difficulties of applying rules based on physical locations to the Internet. It is difficult to make a connection between an e-commerce transaction and a server in one place or another. It is also easy to deliberately locate the server in any low-tax jurisdiction or tax haven. Furthermore, there is no justification for giving sole jurisdiction to tax the income to the country of the server, because often there is no real economic allegiance between the place of the server and the production of the income. Finally, reliance on the location of the server will open the door to tax manipulation. The ten years' experience since the rule was accepted shows that it does not actually generate taxation of international e-commerce income. The OECD itself is gradually reaching the same conclusion.

Applying a One-Source Rule for All E-Commerce Income: Demand Jurisdiction

Professor Reuven Avi-Yonah articulated one of the first responses to the challenges of e-commerce taxation. He considered the main challenges and made several proposals, though it is important to note that he, too, did not give any attention to cyberspace law literature and arguments; instead, he focused entirely on tax. First, he suggested "sidestepping the classification issue by subjecting services, royalties, rents, and sales in electronic commerce to the same source rule." Second, he argued that a non physical threshold is required to tax e-commerce income. Therefore, he suggested that "a gross withholding tax is imposed on sales (and services) provided through electronic means into the Demand Jurisdiction, at a rate equal to the corporate tax rate in the Demand Jurisdiction."

The suggested gross withholding tax leads to overtaxation or double taxation in some circumstances. The first proposal to apply one-source rule for all categories of income is feasible but problematic from a neutrality point of view because it makes two separate international tax regimes: one for e-commerce and one for non-e-commerce. Furthermore, there is a serious difficulty in a proposal that gives sole authority to tax e-commerce income to the demand jurisdiction. The demand jurisdiction contributed its markets to the production of the income, but there is no reason to abandon the right of taxation of the other jurisdictions. The sharing of the tax pie according to this proposal does not meet the normative criterion of internation equity.

Formula Taxation

Professor Jiyan Li examined the international tax regime in the age of e-commerce. She argued that e-commerce exposes and exacerbates the rooted difficulties of the regime in the globalization era.

To manage these difficulties, she proposed making a distinction between portfolio income and direct business income. As to portfolio income, she proposed a uniform withholding tax by the payer's country of residency. As to direct business income, she proposed to split the jurisdiction to tax the income among the different countries involved in the transaction according to a formula that takes into account all the relevant economic-allegiance factors.

This proposal ignores the basic features of e-commerce as global, virtual, and anonymous commerce. It tries to locate the places of e-commerce and the contribution of each place to the production of the income. But all the current challenges of e-commerce stem from the basic fact that there is no place for e-commerce except the Internet, as a place of its own. Hence, the proposal generates the same challenges that face the current international tax regime. The global character of e-commerce makes it difficult to determine the relevant countries to plug into the formula. The same is true of the virtual nature of e-commerce. The anonymity of e-commerce makes it even more difficult to apply the formula.

V. Exclusive Residence-Based Taxation (Personal Jurisdiction)

One of the first responses to e-commerce taxation challenges was made in 1996 by the U.S. Department of the Treasury. The Treasury argued that the growth of new communications technologies and electronic

commerce will likely require that principles of residence based taxation assume even greater importance. In the world of cyberspace, it is often difficult, if not impossible, to apply traditional concepts to link an item of income with a specific geographical location. Therefore, source based taxation could lose its rationale and be rendered obsolete by electronic commerce. By contrast, almost all taxpayers are resident somewhere.

This and other similar proposals might deal well with the feasibility challenges of e-commerce because they totally ignore territorial taxation and focus on personal taxation. But personal taxation cannot be applied to e-commerce, because it is difficult to determine e-commerce corporation residency. In addition, as mentioned above, it is easy to escape such taxation because e-commerce is anonymous, and in any case, e-commerce corporations can easily receive residency in a low-tax or zero-tax country. But the main difficulty with the Treasury proposal lies in its normative basis. It gives advantages and benefits to resident countries, which tend to be developed countries, over source countries, which tend to be developing countries. It infringes inter-individual equity and economic efficiency because it distinguishes between the tax regime on e-commerce and the tax regime on non-e-commerce transactions. It would be very difficult to gain international consensus for such a proposal, as evidenced by the ten years that has passed since the proposal was first made, without its adoption. The OECD proposal is the current leading proposal being applied on the positive level, but it does not produce satisfying taxation of e-commerce income. Reasons for the failure include the limited perspective of the debate and its technical approach.

Given below are an overview of interesting challenges and obstacles that the Internet throws to international taxation. By no means is it comprehensive and in fact represents only the tip of the iceberg in terms of how the technical cognoscenti, who are an increasingly large group, use the Internet today.

II. VARIOUS INTERFACES OVER THE INTERNET

Content Delivery Network (CDN's)

1.1) What is a CDN?

A content delivery network or content distribution network (CDN) is a system of computers containing copies of data, placed at various points in a network so as to maximize bandwidth for access to the data from clients throughout the network. A client accesses a copy of the data near to the client, as opposed to all clients accessing the same central server so as to avoid bottleneck near that server.

A simple hypothetical example would highlight the use of a CDN: a cricket website hosted in one central server (say, in the UK) provides ball by ball audio and text commentary for a match played by the Indian team. This website will have a huge spike of traffic during the day of the match due to visitors from all over the world; if the cricket website management signs up to use a CDN service, like Akamai[10], the bandwidth problems caused by the huge spike can be mitigated to a large as most of the users will be routed to servers (carrying the same information i.e. commentary) closest to their geographical region and hence distribute the load onto the edge servers.

1.2) Technology behind CDN[11]

The capacity sum of strategically placed servers can be higher than the network backbone capacity. This can result in a significant increase in the number of concurrent users. For instance, when there is a 10 Gbit/s network backbone and 100 Gbit/s central server capacity, only 10 Gbit/s can be delivered. But when 10 servers are moved to 10 edge locations, total capacity can be 10*10 Gbit/s.

Strategically placed edge servers decrease the load on interconnects, public peers, private peers and backbones, freeing up capacity and lowering delivery costs. It uses the same principle as above. Instead of loading all traffic on a backbone or peer link, a CDN can offload these by redirecting traffic to edge servers.

CDN nodes are usually deployed in multiple locations, often over multiple backbones. These nodes cooperate with each other to satisfy requests for content by end users, transparently moving content to optimize the delivery process. Optimization can take the form of reducing bandwidth costs, improving end-user performance (reducing page load times and user experience), or increasing global availability of content.

The number of nodes and servers making up CDN varies, depending on the architecture, some reaching thousands of nodes with tens of thousands of servers on many remote point of presences. Others build a global network and have a small number of geographical PoPs.

10 Part III, Chapter 13, Jinyan Li, "Reform Proposal: Uniform Source Withholding Tax and Global Profit Split", International Taxation in the Age of Electronic Commerce: A comparative study

11 Content Delivery Network http://en.wikipedia.org/wiki/Content_delivery_network

Requests for content are typically algorithmically directed to nodes that are optimal in some way. When optimizing for performance, locations that are best for serving content to the user may be chosen. This may be measured by choosing locations that are the fewest hops, the fewest number of network seconds away from the requesting client, or the highest availability in terms of server performance (both current and historical), so as to optimize delivery across local networks. When optimizing for cost, locations that are least expensive may be chosen instead.

In an optimal scenario, these two goals tend to align, as servers that are close to the end user at the edge of the network may have an advantage in performance or cost. The Edge Network is grown outward from the origin/s by further acquiring (via purchase, peering, or exchange) co-locations facilities, bandwidth and servers.

The Internet was designed according to the end-to-end principle[12]. This principle keeps the core network relatively simple and moves the intelligence as much as possible to the network end-points: the hosts and clients. As a result the core network is specialized, simplified, and optimized to only forward data packets. Content Delivery Networks augment the end-to-end transport network by distributing on it a variety of intelligent applications employing techniques designed to optimize content delivery. The resulting tightly *integrated overlay uses web caching, server-load balancing, request routing, and content services.*

1.3) International Taxation issues:

1.3.1) Attribution of profits to P.E

The first problem a CDN throws up is about the location of the PE; assume the HQ of the cricket website company is located in the USA and their main server is the UK. Now if they use a CDN, where is the PE in this case located? It would be easy to say UK but then what about the dozens of edge servers which served the actual content to the end-users and were located in various geographical regions? A case could be made that the main content is derived from the UK server to the various edge servers around the world and hence the UK server is indeed the PE but firstly it seems unfair to attribute all the profits to the UK PE alone in this case; furthermore the content itself might be, technically speaking, fed directly and simultaneously to the edge servers along with the UK server thereby going against the "central" nature of the UK server.

12 Saltzer, J. H., Reed, D. P., Clark, D. D.: "End-to-End Arguments in System Design," ACM Transactions on Communications, 2(4), 1984

1.3.2) Arm's-length fees for exclusive use of tangible property related to CDN[13]

Assume a typical CDN where the network engineers, software engineers and administrators employed by company C located in North America. The Company has numerous switches, routers, auxiliary network equipment etc deployed outside North America – these tangible assets are owned by the foreign affiliates of company C.

The question becomes what is the arm's length fee for exclusive access rights to these tangible assets? Under the Cost-plus and Resale-price method the assumption is that the tangible property is sold outright and used or resold by the recipient. These methods do not even apply when the transactions are not structured in this way. Only the Comparable Uncontrolled Price (CUP) may apply; if under the CUP method one were to look to arm's length lease fees for dedicated servers

III. P2P: THE USE OF "TORRENTS"

2.1) Introduction

Peer-to-peer (P2P) protocols are at the forefront of this change and essentially allow users to share data directly between each other (instead of the traditional client-server concept which could be compared to customer-retail outlet in the real world). In the p2p world, simplistically speaking, everyone is both a consumer and producer. This turns on its head many traditional notions of business exchange.

Bittorrent[14] is one such successful p2p file-sharing protocol based on an intuitive idea whose time has come. Below is a technical explanation which is necessary to understand what p2p, showcased by BitTorrent, is and how it challenges traditional concepts of taxation

2.2) What is a BitTorrent?

BitTorrent is a peer to peer file sharing protocol used for distributing large amounts of data. BitTorrent is one of the most common protocols for transferring large files, and it has been estimated that it accounts for approximately 27-55% of all Internet traffic (depending on geographical location) as of February 2009.

BitTorrent protocol allows users to distribute large amounts of data without putting the level of strain on their computers that would be needed for standard internet hosting. A standard host's servers can easily be brought to a halt if extreme levels of simultaneous data flow are reached. The protocol works as an *alternative data distribution method that makes even small computers (e.g. mobile phones) with low bandwidth capable of participating in large data transfers.*

13 Pg 137, "Provision of CDN" , Elizabeth King, Transfer Pricing and Corporate Taxation, Problems, Practical Implications and Proposed Solutions
14 BitTorrent Protocol http://en.wikipedia.org/wiki/BitTorrent_(protocol)

First, a user playing the role of file-provider makes a file available to the network. This first user's file is called a *seed* and its availability on the network allows other users, called *peers*, to connect and begin to download the seed file. As new peers connect to the network and request the same file, their computer receives a different piece of the data from the seed. Once multiple peers have multiple pieces of the seed, BitTorrent allows each to become a source for that portion of the file. The effect of this is to take on a small part of the task and relieve the initial user, distributing the file download task among the seed and many peers. With BitTorrent, no one computer needs to supply data in quantities which could jeopardize the task by overwhelming all resources, yet the same final result—each peer eventually receiving the entire file—is still reached.

After the file is successfully and completely downloaded by a given peer, the peer is able to shift roles and become an additional seed, helping the remaining peers to receive the entire file. This eventual shift from peers to seeders determines the overall 'health' of the file (as determined by the number of times a file is available in its complete form).

This distributed nature of BitTorrent leads to a flood like spreading of a file throughout peers. As more peers join the swarm, the likelihood of a successful download increases. Relative to standard Internet hosting, this provides a significant reduction in the original distributor's hardware and bandwidth resource costs. It also provides redundancy against system problems, reduces dependence on the original distributor and provides a source for the file which is generally temporary and therefore harder to trace than when provided by the enduring availability of a host in standard file distribution techniques.

A BitTorrent client is any software program that implements the BitTorrent protocol. Each client is capable of preparing, requesting, and transmitting any type of file over a network, using the protocol. A peer is any computer running an instance of a client.

To share a file or group of files, a peer first creates a small file called a “torrent”. This file contains metadata about the files to be shared and about the tracker, the computer that coordinates the file distribution. Peers that want to download the file must first obtain a torrent file for it, and connect to the specified tracker, which tells them from which other peers to download the pieces of the file.

Though both ultimately transfer files over a network, a BitTorrent download differs from a classic download in several fundamental ways:

BitTorrent makes many small data requests over different TCP connections to different machines, while classic downloading is typically made via a single TCP connection to a single machine (i.e traditional client-server)

BitTorrent downloads in a random or in a "rarest-first” approach that ensures high availability, while classic downloads are sequential.

Taken together, these differences allow BitTorrent to achieve much lower cost to the content provider, much higher redundancy, and much greater resistance to abuse or to "flash crowds" than regular server software. However, this protection, theoretically, comes at a cost: downloads can take time to rise to full speed because it may take time for enough peer connections to be established, and it may take time for a node to receive sufficient data to become an effective uploader. This contrasts with regular downloads (such as from an HTTP server, for example) that, while more vulnerable to overload and abuse, rise to full speed very quickly and maintain this speed throughout.

Variations: A software program, Vuze[15], was released, introducing support for "trackerless" torrents through a system called the "distributed database." This system is a Distributed Hash Table[16] implementation which allows the client to use torrents that **do not have a working Bit torrent tracker**.

2.3) International taxation issues

2.3.1) Source rules

When a user gets a file using a torrent, he has obtained pieces of the file from dozens if not hundreds of people all over the world. In such a scenario, what is the source of the file? It can be argued to be the location of the master or "tracker" node but then new variations of "trackerless" systems are coming into vogue. The huge use of torrents, unfortunately both legally and illegally, clearly shows that existing source rules are stretched

2.3.2) Permanent Establishment

The torrent file is distributed by random people all over the internet; if a company incorporated in the USA has a server in India which distributes intangible property (say, media files) to customers. If the Indian server uses torrents to distribute this media file will the server in India be considered the P.E to which the profits of the intangible property transaction are to be attributed to? If so, how much of the profits should be attributed to it - if 1000 copies are distributed not all of them will be through the server, most of the data would be distributed through other "peers". If the system were "trackerless", then the server itself can't be regarded as the master or central repository

15 Pg 867, Charles E. McLure Jr., Taxation of Electronic Commerce: Economic Objectives, Technological Constraints and Tax Laws" (1997)

16 Hari Balakrishnan, M. Frans Kaashoek, David Karger, Robert Morris, and Ion Stoica. Looking up data in P2P systems. In Communications of the ACM, February 2003

IV. TRANSFER OF BUNDLED INTELLECTUAL PROPERTY – WEB-BASED BUSINESS MODEL

3.1) Introduction

The traditional notion of software has been a company hiring engineers who sit in a building writing code to create a software program used for a specific purpose and such program once developed is sent to customers in the tangible form of CD's or DVD's . This model equated well with the assembly line manufacturing process and an age-old model of tangible products. However, majority of software that is developed nowadays utilizes business to business (B2B) & business to consumer (B2C) models

Today there exists "web" companies which are valued at billions of dollars whose "crown jewels" are usually the intangible intellectual property they own or their patented business models or their proprietary technology web-service platforms. Examples of such web companies are Google, Facebook, eBay, etc.

3.2) A simple web-based business model

In this case study we take a web-based business model related to the online advertising market (also called SEM – Search Engine Marketing), one of the fastest growing markets in the world. This is similar to the case study presented in Elizabeth King's case study on Replication of Internet-Based Business Model[17]

Search engines like Google[18] derive most of their income from such markets which allow advertisers to bid on keywords in an auction-model on their technology platforms; when users search for the keywords which have been bid upon they are shown text ads sorted in the descending order of their bid. Such a market gave rise to a host of web companies who provide service to advertisers to efficiently and optimally bid on millions of companies – they are essentially providing SEM solutions to online advertisers.

We consider a USA company, USCo, which provides SEM i.e. Search Engine Marketing solutions using its unique and patented algorithmic techniques for efficient and optimal bidding; in simple terms the company takes control of advertisers online campaigns of its clients and bids on keywords in the online advertisement marketplaces offered by search engines like Google Adwords[19]. USCo's clients are typically two-fold: companies who wants to advertise online to boost traffic to its website and sales of its products & services, advertising agencies who provide full-service to their clients and provide both offline (TV, newspapers etc) & online advertising solutions for clients.

17 Chapter 8, "Replication of Internet-Based Business Model", Elizabeth King, Transfer Pricing and Corporate Taxation: Problems, Practical Implications and Proposed Solutions

18 http://www.google.com
19 Google Adwords, http://adwords.google.com

USCo has a successful and established business model and handles over $500 million in advertising spend on the various search engines. Parts of USCo's business model are patented. Further, USCo has developed proprietary software for its internal usage – to process, analyze & model the huge amount of data it churns daily. USCo has also developed online marketing & solicitation tools which it uses to market to, obtain, test and sign-up clients.

Now an Indian company, lets call it IndCo, wants to replicate USCo's business model in India. Towards this the top management gets training in USCo and on doing so provides the USCo's business model of online advertising solutions to clients & ad agencies in India.

To summarize:

USCo transfers the intellectual property of its proprietary software modified to suit local conditions.

USCo also provides the right to use of its marketing and solicitation online tools to IndCo, again these pages have to be modified slightly for local conditions.

USCo will perform routine service, maintenance and upgrades on the proprietary software given to IndCo

USCo will provide legal and financial planning and advisory services to IndCo

IndCo has been issued the rights to use USCo's trademark and name in the Indian market

3.3) International taxation issues:

The above model is akin to a business format franchise[20]. The key question is what are the arm's length services fees payable by IndCo to USCo?

The resale and cost-plus methods presuppose a particular division of labour that is not characteristic of the USCo and IndCo. The profit-comparison methods would require quasi-comparable companies in the same startup stage and would probably yield no residual profits to USCo.

In short, none of the recommended transfer pricing methods will provide a conclusive answer to this problem of transferring a bundle of intangible assets in a franchisee model.

20 Mobil Oil Corp vs Commisioner of Taxes, 445 U.S 425(1980)

V. CONFERENCING SYSTEMS

The traditional approach of services being rendered by professionals face to face is no longer the reality. The reality is using phone or video conferences to render services is now becoming common; if anything technology will progressively make distances a thing of the past. This flies totally in the face of the definition of a permanent establishment.

Take the case of a UK IT company whose services are essentially providing software training; their bill might run into hundreds of thousands of dollars and they might have a "software program manager" to video conference three days a week and coach Indian engineers on using Design Patterns[21] and other best practices in Software Engineering. Their profit can't be attributed to a PE in India as there is no fixed base of carrying on business here though the people who benefit the most are the engineers in India.

The scenario is the same if a lawyer firm regularly advises clients on Skype calls or emails. The legal fees billed might run into hundreds of thousands of Rupees benefiting the Indian clients but there is no share of the pie by the Indian Revenue authorities.

Similarly, if a hospital practices "tele-medicine" and diagnoses ailments of Indian patients sitting in the UK by a combination of videoconferencing and accessing the patients medical records online, they won't be paying any taxes in India whatsoever.

The use of immersive communications or tele-presence systems like Halo[22] will take things a step further. Its is evident that permanent establishment as a concept has to change and change quickly to adapt to the pace of change driven by the world of science and technology.

21 Gamma, Helm, Johnson & Vlissides (1994). Design Patterns (the Gang of Four book). Addison-Wesley. ISBN 0-201-63361-2.
22 HP Halo telepresence and video conferencing solutions - http://h20338.www2.hp.com/enterprise/us/en/halo/index.htm

VI. INTERNATIONAL TAXATION ISSUES AND CONSIDERATIONS:

In the past, in an environment where the most senior manager or managers tended to operate from and meet in a single location such as a head office, determination of the place where key management and commercial decisions were made was not too difficult. The place where the top level management activities occurred would mainly coincide with the place where the company was incorporated and had its registered office, where the business activities were conducted and where the directors or senior managers resided. It was therefore, as the OECD Commentary states "rare in practice for a company, etc. to be subject to tax as a resident in more than one State."

However, the communications and technological revolution is fundamentally changing the way people run their business. Due to sophisticated telecommunication technology and fast, efficient and relatively cheap transportation, it is no longer necessary for a person or a group of persons to be physically located or meet in any one particular place to run a business. This increased mobility and functional decentralisation may have a significant impact on the incidence of dual resident companies, and the application of the place of effective management tie-breaker rules.

Therefore, a place of effective management will generally be where key management and commercial decisions necessary for the conduct of a business are in substance made and given. This will ordinarily be where the directors meet to make decisions relating to the management of the company, but the determination of a place of effective management is a question of fact and other relevant factors taken into account by the courts have included:

- Where the centre of top level management is located.

- Where the business operations are actually conducted.

- Legal factors such as the place of incorporation, the location of the registered office, public officer, etc

- Where controlling shareholders make key management and commercial decisions in relation to the company; and

- Where the directors reside.

VII. BIT COIN TECHNOLOGY (VIRTUAL CURRENCY)

Bitcoin is a peer-to-peer payment network and digital currency based on an open source protocol, which makes use of a public transaction log. Bitcoin was introduced in 2009 by pseudonymous developer "Satoshi Nakamoto". It is called a cryptocurrency because it uses public-key cryptography. When paying with bitcoin, no actual exchange takes place between buyer and seller. Instead, the buyer requests an update to a public transaction log. This master list of all transactions shows who owns what bitcoins currently and in the past and is maintained by a decentralized network that verifies and timestamps payments using a proof-of-work system. The operators of this network, known as "miners", are rewarded with transaction fees and newly minted bitcoins.

Bitcoin is often criticized for encouraging tax-evasion by making it hard for governments to collect taxes because transactions are thought to be anonymous. As showed in the work by Reid and Harrigan[23], Bitcoin transactions are not as anonymous and untraceable as many users might think, making it at least risky to use them for illegal purposes. Relatively simple topographical network analysis can be employed to identify a set of transactions belonging to the same Bitcoin user. As soon as one of those addresses is known to belong to a certain person, all the other transactions can also be traced back to this person as well. While this might be bad news for criminals wanting to transact in Bitcoins, government officials are probably still not rejoicing, because tracing Bitcoin transactions to individuals is often not possible with 100% certainty. The chance of producing false positives as well as false negatives make the process only worthwhile on a case-by-case basis. There is however an easy solution to selectively and voluntarily renounce anonymity, while keeping the overall privacy of the Bitcoin system. Such a mechanism would especially benefit tax-authorities, making it not only possible to keep track of taxable incomes in a Bitcoin economy but also easier and more secure than with traditional money.

Under the system, each company wishing to accept payments in Bitcoin would have to register a certain large set of Bitcoin addresses at the tax authorities. This list of addresses would henceforth be associated with this specific company and the blockchain would serve as record for all taxable Bitcoin incomes. The registration process can be fully automated through a web-interface so that it is easy for companies to always have enough registered Bitcoin addresses available for their incoming payments. Within the registered block of addresses, companies are free to assign different addresses for each customer or for each transaction.

Of course, additional measures have to be taken to prevent companies from just using unregistered addresses for a part of their transactions, hence illicitly reducing their taxable income. One easy and probably very effective method would be to offer customers an online service to check whether a given address is registered at the tax office of a country.

23 F. Reid and M. Harrigan, \An Analysis of Anonymity in the Bitcoin System," ArXiv e-prints , Jul. 2011.

A simple web-interface for entering a Bitcoin address and returning a yes or no answer would suffice. Customers would be able to check for each payment if the receiving company does pay its taxes accordingly. Such checks could even be done automatically by the Bitcoin client, warning the customer before paying to an unregistered address. Companies would have a high incentive not to use unregistered addresses because every time they do, they run the risk of being reported by the customer. For corporate customers checking the payment addresses could even be required by law, as is already the case with the VAT identification number in the European Union. With such a rather simple system, the privacy of Bitcoin transactions could be retained (nobody except the tax office knows which addresses belong to which company) and corporate tax evasion be made very hard. Because the involved processes can be fully automated there is little additional administrative bur-den for the authorities - it might even become easier once a significant portion of payments is done with Bitcoins. Getting the tax authorities of a country to adopt such a Bitcoin registration service is obviously going to meet some resistance, but governments already begin to acknowledge the changing reality of modern payment systems and recognize the need for new laws and regulations.

Especially the anti money- laundering laws have recently been updated through-out the European Union to account for new forms of electronic money[24]. Even completely decentralized and (to a certain degree) anonymous currencies such as Bitcoin can easily be integrated in existing taxing systems, without any support from the currency itself. As was shown, tax evasion with Bitcoin can be made even harder than it is with traditional forms of payments such as cash or bank transfer. Decentralized crypto-currencies are therefore nothing to worry about from the perspective of the tax authorities.

24 \Directive 110/ec, oj l 267, p. 7 of 10.10.2009."

VIII. CONCLUSION AND SUGGESTIONS:

In short, the Internet is a disruptive means not only in the science and technology world but also in the international taxation world! It completely skewers the traditional concepts of Permanent Establishments and brings to stark reality the problems with source-taxation under the current tax regime.

Recently in 2013, Ministry of Economy and Finance of France released the Collin & Colin report which considered a key reference for any future French tax reform regarding the digital economy. The proposed measures result from the following assertions by the report:

Customers' data collected by internet companies in foreign jurisdictions is considered a source of value creation essential to the business of these companies and the intangibles they develop and exploit (advertising, pricing adjustments, purchase recommendations, etc.). By monitoring the internet users' activity and collecting, storing and re-using their personal data and information, the report infers that the internet companies benefit from uncompensated work performed by the internet users.

Large companies in the digital economy benefit from a very low global corporate tax rate due to the location of their headquarters in low tax jurisdictions.

The intangibles developed by such companies are located in these low tax jurisdictions.

Foreign internet companies benefit in France (and other jurisdictions) from massive public investment (infrastructure, broadband networks etc.) to which they do not contribute in building or financing.

Therefore, the report proposes the following two steps for taxing digital companies:

Creation of a new tax which would take value creation by internet companies into account. According to the authors, the tax should be designed to create incentives for digital economy companies to adopt compliant practices in favor of "user empowerment and innovation". The precise determination of the tax and its rate are not yet defined but the tax liability could depend on the behavior and the transparency regarding the use of data collected by the digital companies.

Introduction of a new PE definition for the digital economy whereby a PE would be created each time internet user data is collected in a domestic market. Domestic data collection would imply some de facto domestic uncompensated workers and, as such, a PE.

The response to the advent of e-commerce has been classic by the powers that be – either it is to invent even more complex systems by coming up with new and arbitrary taxes like a "bit tax", "net tax" etc. (or) trying to shoe-horn Internet and e-commerce taxation into existing models with exceptions and caveats. None of these approaches are likely to work well; we cannot fix something which is fundamentally broken. It would appear to be more beneficial to take a step back and go to the first principles and arrive at a simpler and more intuitive system of taxation – such an option already seems to exist in the form of global formulary apportionment. Finally, elements of formulary apportionment should be incorporated into the existing PE regime. This could ensure to a reasonable extent that the international taxation regime is in a position to respond to the challenges which are being posed by e-commerce.

It is high time that developing countries will have to protect their revenue base keeping in mind challenges of Digital Economies and hence one of the emerging solutions appears to be a Banking Transaction Tax rather than Source Taxation.