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Shaping the Networked World

*Drivers of Change in the Networked
Communications Environment*

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The Freedom of Expression Project

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Glossary of Acronyms and Technical Terms

2G – ‘Second Generation’ mobile phone standards that include limited data capabilities, for example for the sending of text messages (SMS or short message service).

3G – ‘Third Generation’ mobile phone standards that allow for higher data transmission speeds, facilitating broadband internet access.

AT&T – American Telephone and Telegraph company, the old incumbent telecommunications company in the USA. The company was broken up in 1984 by anti-trust legislation into regional telephone companies popularly referred to as the ‘Baby Bells’. AT&T still operated as a long distance national carrier in the USA. AT&T was bought in 2005 by SBC (a former Baby Bell), and the company was re-named AT&T.

Blog – Short for ‘web log’, a website-based newsletter that is regularly updated.

BT – British Telecom, the incumbent telecommunications company in the UK.

DSL – Digital Subscriber Line, the technology that allows for the high speed transmission of data across copper telephone lines for example in broadband internet access.

EU – European Union.

FCC – Federal Communications Commission, the body responsible for regulating interstate communications in the USA.

IFPI – International Federation of the Phonographic Industry, the body that represents the recording industry worldwide.

Incumbent – Used in the field of communications to refer to the company that currently holds the most power in a particular communications sector. Incumbents are usually companies that were previously state-owned monopolies.

IP / Internet Protocol – The protocol that moves packets of data across the internet, routing them according to the address (IP number) of the device receiving the data.

IPR – Intellectual Property Rights, the legal rights that the creators of new ideas (including technology and artistic works) have over their creation.

IPTV – Internet Protocol Television, services that provide access to video and television services via an internet connection. Also known as ‘Video on Demand’.

ISP – Internet Service Provider, a company that provide internet connections to end users. Many ISPs do not own physical networks themselves and act as links between network owners and end-users.

Liberalisation – The opening up of an industry to more competition, often involving the relaxation of government restrictions.

NCE / Networked communications environment – All of the physical infrastructure and technologies, companies, governments, members of the public and other actors that use and control digital communications. This includes the relationships between these actors and the underlying economic, social and political structures that influence them.

NGN – Next Generation Network, IP based converged networks that allow for the transport of any type of data across a single network.

NTT – Nippon Telegraph and Telephone Corporation, the incumbent telecommunications company in Japan.

PC – Personal Computer (desk-top and lap-top).

Protocol – A shared set of rules or standards that allow computing technologies to connect and communicate with each other.

TCP - Transmission Control Protocol, the protocol that checks whether all of the data packets being sent across the internet have been received at their destination, and triggers re-transmission if some have been lost.

TCP/IP – The two protocols that form the basis of internet communication, allowing remote devices connected to the internet to communicate with each other. See separate definitions for TCP, IP and Protocol.

TRIPS – Agreement on Trade Related aspects of Intellectual Property rights, an international treaty created in 1994 and administered by the WTO.

UN – United Nations

Unbundling – The separation out of the components of a network, for example into supply and transmission. Unbundling or common carrier legislation often means that companies who own the physical networks have to allow other companies to transmit data across them.

WiFi – ‘Wireless Fidelity’, technological standards that allow wireless users to link to each other and to the internet across distances of around 100 metres.

WiMax – ‘Worldwide Interoperability for Microwave Access’, technological standards that allow for wireless internet access across distances of around 10 kilometres.

WIPO – World Intellectual Property Organisation, a specialist agency of the UN responsible for the promotion of intellectual property worldwide.

WSIS – World Summit on the Information Society, the UN-sponsored conference held in two phases in 2003 and 2005 to address global changes and challenges wrought by new communications technologies. The annual Internet Governance Forum was an outcome of WSIS, intended as a global multi-stakeholder arena for continued discussion.

WTO – World Trade Organisation, the international organization responsible for regulating trade at the global level.

1) Introduction

Technological innovation is having profound impacts on the ways people communicate with each other. The dramatic rise in the use of the internet over the last decade and the proliferation of mobile phones throughout the world have made it easier, faster and often cheaper for people to communicate, both directly and via traditional and new media platforms. These changes in communications have important implications for the right to freedom of expression and the wide array of institutions and rights that rest upon it including democracy, access to information and cultural expression.

This paper¹ aims to provide an understanding of how and why change happens in the new networked communications environment. This is an important starting point for the *Freedom of Expression Project*² for the following reasons:

- To understand why the networked communications environment has taken the form it has today.
- To help analyse the challenges and opportunities that this presents for freedom of expression.
- To understand what changes are currently occurring in the networked communications environment and how these are likely to affect freedom of expression.
- To identify possible areas of intervention for the promotion freedom of expression in the networked communications environment.

Technological change does not occur in a political, economic or social vacuum. The development and geographical distribution of the communications technologies that are available to people today are the result of political and economic dynamics that have affected the nature, pace and spread of technological innovation. To help understand these dynamics, this paper uses the concept of 'drivers of change', a term that refers to the array of actors, institutions and structures that interact with each other in complex ways to produce change. These interactions are in part determined by power relationships between actors/stakeholders and by underlying 'structural scaffoldings' (Adeney and Wyatt, 2004) of economic forces, social norms and cultural values.

For the sake of simplicity, this paper groups the drivers of change in the networked communications environment into three main categories:

- **Technology** - the advances in technology and innovation that are changing the platforms that people use to communicate with each other.
- **Politics, regulation and governance** – the governmental and private organisations that mediate between the interests of different stakeholders in the networked

¹ Thanks to Kate Wilkinson, Andy Valdar, Becky Hogge, Drew Clark and Andrew Puddephatt for their help and for taking the time to talk through some of the issues covered in this paper. Any mistakes are the author's own.

² *The Freedom of Expression Project* is funded by the Ford Foundation and is concerned with exploring the opportunities and challenges for freedom of expression in the modern world. Other background papers for the project include *Freedom of Expression in the Age of Networked Communications: An Overview* by Beck Hogge (September, 2006) and *The Contemporary Communications Environment* by Lisa Horner (October 2006). Both papers are available on the project website, www.freedomofexpression.org.uk.

communications environment, and the economic and social structures that affect their actions.

- **Economics and markets** - the economic structures that underlie the networked communications environment, and the different groups of stakeholders that act within it, including service providers and users of communications technology.

Part One of this paper provides insight into how these drivers of change have interacted to shape the global networked communications environment. Part Two is concerned with how they are affecting current trends and the direction of future changes. This will provide a basis for the *Freedom of Expression Project* to explore the implication of these changes for the right to freedom of expression.

PART ONE – THE NATURE OF THE NETWORKED COMMUNICATIONS ENVIRONMENT

2) A model for understanding the networked communications environment

'Networked communications environment' (NCE) is a somewhat amorphous and flexible term that encompasses a wide range of industries, actors and technologies. These include the traditional news and entertainment media industries, the telecommunications industry (from traditional fixed-line telephones to wireless internet) and equipment and technology developers and manufacturers. Stakeholders in the NCE include: private service providing companies; state bodies that own companies and/or exert official and unofficial political influence; international bodies representing government and/or private company alliances involved in regulatory and oversight functions; businesses using communications services; the general public which act as 'passive users' of communications services and create market demand; and finally 'active users' who directly participate in shaping the NCE through creating new uses for technology or engaging as civil society activists. The development of networked communications and new technologies has brought this disparate group of actors together, forming new direct and indirect relationships between them.

Whilst it is important to maintain a flexible notion of the networked communications environment to appreciate the vast array of actors involved and the ever-changing nature of the relationships between them, we need a model that can help to assess the main drivers of change. This paper uses a layer model³ as outlined in Figure One, dividing the NCE into 'physical', 'connectivity and code', 'applications' and 'content' layers. Figure One illustrates the main technologies and actors involved in each layer for the internet, but the model also broadly applies to other sectors within the NCE such as broadcasting and telephony. In summary, the physical layer contains all of the different networks and technological equipment required to transmit communication signals. The connectivity and code layer represents the data flowing across physical communication networks and the type of signals that are used to transport it. The application layer contains software technologies that allow users to interpret and navigate the communication signals. The content layer concerns the actual subject matter of the communication. This model is useful as a rough guide to the workings of the NCE for the purposes of this paper; of course in practice divisions between the layers are not rigid and actors often operate in more than one layer.

Figure One also illustrates the main factors that drive change in the NCE, grouping them into three categories: Technology; Politics, regulation and governance; and Economics and markets. These drivers interact with each other, and can exert influence at any of the layers of the NCE to affect its overall character and shape. Figure Two illustrates the drivers of change in more detail, showing some of the main actors operating in each of the three categories and the ways they can influence the nature of the NCE. The power relationships between these actors and the ways their activities interrelate influence the NCE's character and development.

³ Layer models are commonly used to depict communications structures, particularly in telecommunications. This version of the model draws on Benkler (2000); Lessig (2001); Fransman (2001); and Mueller (1999).

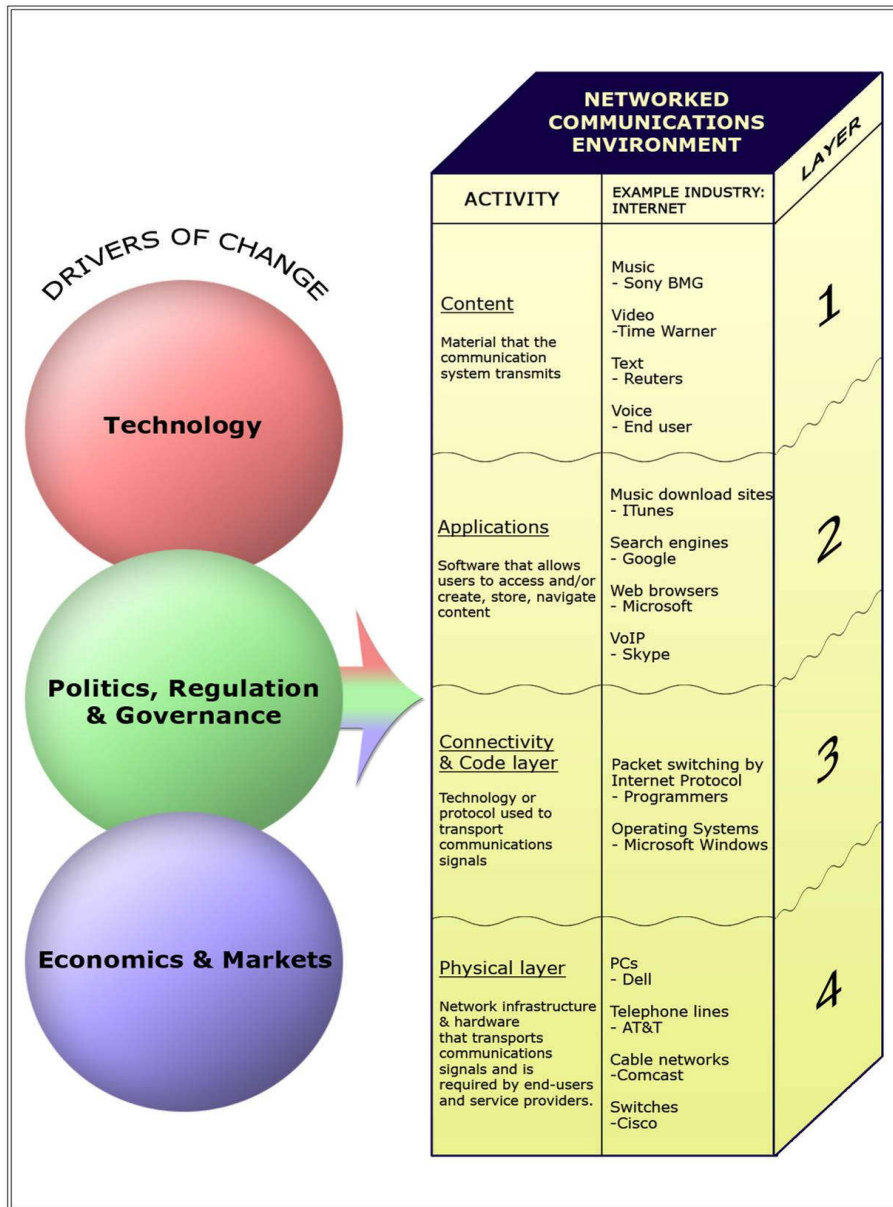


Figure One: Model of the NCE and the main drivers of change

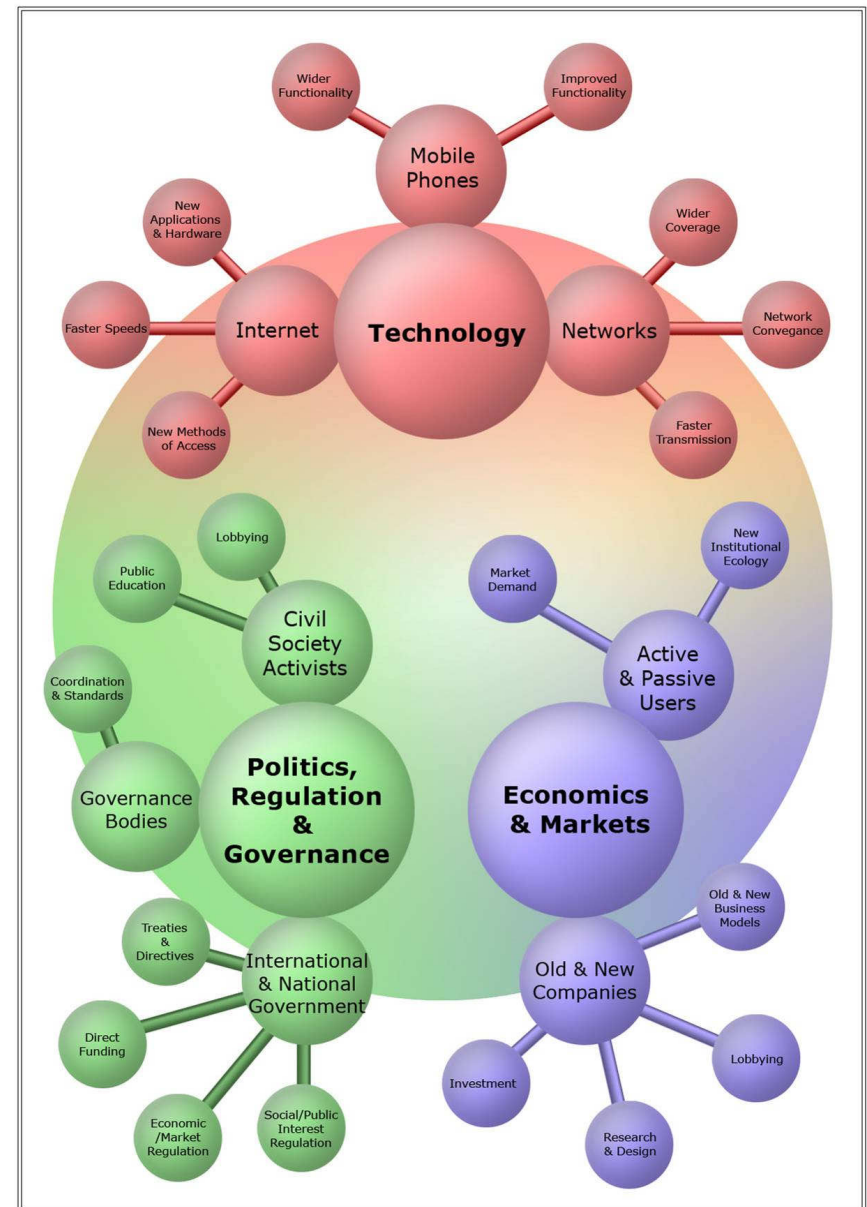


Figure Two: The main actors in the 'drivers of change' categories and how they can shape the NCE

3) The evolution of the networked communications environment

3.1 - From vertical integration to horizontal layers in the NCE

Before the 1980s the best way to think of the communications sector was as vertical rather than horizontal layers. The telecommunications (telecoms), mass media and computing industries on the whole operated separately from each other. Most companies were state-owned or state-funded monopolies⁴, and provided 'end-to-end' services for customers. For example, telecommunication companies manufactured telephone handsets; built, owned and operated the networks along which voice signals were transported; and managed the ways in which these signals were transported across the networks (Mueller, 1999).

The rationale behind this vertical integration of communications industries was that they were considered to be natural monopolies (Fransman, 2001). The high costs of the technologies used, for example in telephony and the production and transmission of television programmes, not only favoured economies of scale but also made it too expensive for governments or companies to connect and support competing networks or end-user terminal models (Mueller, 1999). With its high costs, 'intelligent' technology had to be centralised, accessed by users via 'dumb' equipment such as telephone and television sets that they could not interact directly with in the same manner as they later could with personal computers (PCs). This spawned the 'one-to-many' model of the mass media in which communication mainly flowed in one direction from media companies to consumers, creating what Benkler (2000) refers to as a 'market for eyeballs'.

The vertical integration of communications industries and their monopolisation by state-owned companies was undermined from the 1980s as a result of technological, economic and regulatory changes. In the arena of technology, the digitalisation of networks and rapid advances in the power of microprocessors reduced the costs of technology and of linking together competing networks and end-user terminals, in turn lessening the pressures to achieve economies of scale (Mueller, 1999). The communications industries could therefore no longer be viewed as natural monopolies. These technological developments coincided with the rise of free market economic ideology in the 1980s, and with lobbying from companies eager for the removal of barriers hampering their growth and penetration of new markets (Whalley and Curwen, 2006). Governments therefore started to introduce regulation to increase competition and erode the monopoly position of the incumbent operators.

In the telecoms sector, both AT&T in the USA and BT in the UK lost their monopoly in 1982. BT was privatised in 1984 and NTT in Japan was privatised in 1985. National and regional regulation such as the 1996 USA Telecommunications Act and European

⁴ As mentioned in the *Contemporary Communications Environment* paper, an exception to the domination of communications by state-owned monopolies was the newspaper industry. Newspapers in the West tended to be privately owned and the sector has been more competitive than the telecoms and broadcasting sectors. The relative lack of regulation of the newspaper industry is often quoted as being a result of the ubiquitous nature of broadcasts compared to newspapers, but Vick (2006) suggests that it is also due to the prevailing economic ideology of market liberalism at the time of the growth of the newspaper industry in the late 19th Century.

Community Directives continued this trend throughout the 1990s. At the international level, the World Trade Organisation (WTO) Agreement on Basic Telecommunications of 1998 spurred the wave of liberalisation to less developed countries, encouraging them to open up markets to foreign investors (O'Siochru et al, 2002). This regulatory drive for more competition in the sector is continuing, for example with the new European Regulatory Framework of 2002 and ongoing negotiations over new telecoms legislation in the USA.

In the media sector, deregulation took off in the 1980s, although the American mass media had been commercially driven since the 1920s and the UK allowed for commercial competition in the broadcast sector as early as the 1950s. Deregulation was spurred by the rise of neoliberal market ideology and consumer demand for more choice. In the UK, the television broadcaster Channel 4 was established as a commissioning rather than production company, in order to increase competition in the production sector. The Broadcasting Acts of 1990 and 1996 further increased competition by reducing regulation of commercial broadcasters, promoting opportunities for independent producers and liberalising media ownership rules (Vick, 2006). Whilst deregulation of the media industry is an observable trend (particularly in terms of the relaxation of national and foreign ownership restrictions), full deregulation has been prevented in many countries by governments keen to ensure that media content meets public service obligations (both social and cultural) (O'Siochru et al, 2002). These trends, and the implications they have for the type and quality of media content, are discussed in the Global Partners *Contemporary Communications Environment* paper.

In terms of the shape of the communications environment, the overall result of changes in technology, economic policy and regulation has been the fragmentation of the vertically integrated communications industries and increased competition between companies. For example, when competition was introduced into telecoms, new entrants to the market did not own their own networks and so tended to specialise in the connectivity layer of the communications model, facilitated by regulation that required incumbent companies to allow competitors to use their networks. Increased competition in the connectivity layer in turn prompted incumbents to focus their resources and energy in this layer. Fransman (2001) describes how this led many incumbent operators to make the decision to leave research and development (R&D) activities to specialist equipment firms by the end of 1995. Thus, a separation of operations in the physical and connectivity layers in the communications environment began to emerge.

The process of vertical disintegration and horizontal layering has been less marked in the media industry than in the telecoms sector. For example, in the USA cable companies have retained control over most aspects of cable television, from the production of content to its transmission and the ownership of networks (Cooper et al, 2006). However, across the mass media industry, increased competition in the sector from the 1980s and the related rise of new technologies such as cable and satellite did prompt a degree of separation of activities into the horizontal 'layers' of the NCE model. The entrance of the internet into the communications environment from the mid 1990s has furthered this process of horizontal layering, as will now be discussed.

3.2 – The rise of the internet as a major driver of change

The internet's architecture is based on an 'end-to-end' design, with the intelligence in the network located at its edges in end-user terminals. The network itself is designed to be 'dumb' in that it permits the transfer of any form of data across it using a single protocol, that of TCP/IP (hereafter referred to as internet protocol or IP). The equipment required for reading this data and reassembling it into usable formats is not part of the network itself, but is rather located in terminals attached to the network. At the time of the development of the internet from the 1960s to 1980s, this 'end-to-end' design contrasted starkly with the centrally controlled telephone network in which, as described above, intelligence and content transmission was centrally located and controlled.

The internet's decentralised design was purposeful and this accelerated the process of specialisation and competition amongst communications companies within the horizontal sections of the layer model. The research that led to the development of the internet was initially funded by the Defence Department of the US government which was concerned to develop a communications system that would be less vulnerable to attack and disruption than the centralised telephone network (Lessig, 2001). The internet was therefore purposefully designed to be a decentralised 'network of networks'. The 'end-to-end' concept of the internet also increased the network's flexibility, allowing for the computer equipment in which the US government had heavily invested in to talk to each other, as well as allowing for future innovation in data transport mechanisms along its 'dumb' networks (ibid). Echoing Vick's (2006) assertion that the level of government regulation in different media depends on the prevailing politico-economic ideology at the time of its proliferation, Goldsmith and Wu (2006:23) suggest that this open and decentralised design became a kind of philosophy that guided the original architects of the internet. They describe how these architects "in effect ...built strains of American libertarianism, and even 1960s idealism, into the universal language of the internet". The internet was thus designed to be a horizontally layered system in which anyone could author content⁵ and send it over any network infrastructure using the code of IP. It therefore spurred on the vertical disintegration of the old communications industries into the specialised 'horizontal layers' of service provision around which this paper's model of the NCE is based. Anyone could now produce content and send it across the internet without having to invest in network infrastructure. Internet service providers could compete in the connectivity layer, providing users with internet access without owning networks or having specialist knowledge of different transmission methods or code.

In terms of drivers of change, playing an equally important role in the development of the internet as the US government's funding of research was its involvement in the regulation of the incumbent US telecoms company AT&T (Lessig, 2001). Despite viewing telecommunications as a natural monopoly, the US government had been concerned about limiting the power of AT&T for decades before its eventual break up in 1984. Legislation had already been passed that limited the control that AT&T had over

⁵ The ability of users to author and view content on the internet was spurred on by the development of the html protocol that runs over IP by researchers at a European physics lab from the late 1980s. This allowed for the creation and navigation of web pages. Lessig (2001) describes how the fact that the html protocol was made available in the public domain rather than its use being subject to licence agreements led to it being adopted as a universal means of displaying data on the web, in turn making the internet and the information displayed on it accessible to the general public.

the physical infrastructure making up its networks and from the 1970s it was increasingly forced to lease lines to competing companies (Lessig, 2001). The internet, designed around a protocol that could be used on any network, arguably would not have flourished had AT&T not been required by law to allow the protocol to use AT&T networks to transport its data.

The internet has created new opportunities and challenges for the variety of actors who now interact in the networked communications environment. Older companies and technologies face competition from new internet-based communications, but also have opportunities to expand into new business areas. Governments are faced with new regulatory challenges, whether they are concerned with fostering competition, controlling information flows or ensuring universal access to public services. And importantly, the internet has presented the public with new opportunities to engage in interactive communication, thereby challenging the uni-directional one-to-many flow of information of the mass media model.

These opportunities and challenges are examined in more detail through the lens of freedom of expression in Becky Hogge's (2006) overview paper, and will be further explored throughout the *Freedom of Expression* project. Having outlined how political, economic and technological drivers of change interacted to produce the contemporary NCE, the rest of this paper is concerned with how they are continuing to influence its evolution and shape the direction of future change.

PART TWO – Trends and Dynamics in the Networked Communications Environment

4) Trends and Dynamics – Technology

4.1 - Drivers of change in the spread of fixed internet technologies: the politics and economics of digital divides

As Figures Three and Four show, internet use is increasing at the global level in both developed and less economically developed regions. However, a substantial 'digital divide' still exists between richer and poorer countries. Access to broadband (technologies offering high speed and permanent rather than slower dial-up connections) is also increasing in all regions, but the broadband divide is even greater than that of overall internet access (Gray and Magpantay, 2005). Only 20% of the 155 million broadband subscribers across the world in 2004 were in developing countries, dropping to 6% if China is removed from the equation⁶ (WSIS, 2005). Denmark alone has more than double the international internet bandwidth (the infrastructure that affects the speed at which web pages load) of Latin America and the Caribbean combined (ibid).

Levels of internet and broadband access are broadly correlated with GDP but this relationship varies between countries as a result of differences in underlying political and economic drivers of change (Teltscher and Korke, 2005). Box One below explores the reasons behind the low levels of internet penetration⁷ in Africa, and Box Two examines the factors underlying differences in broadband penetration between East Asia, the USA and Western Europe.

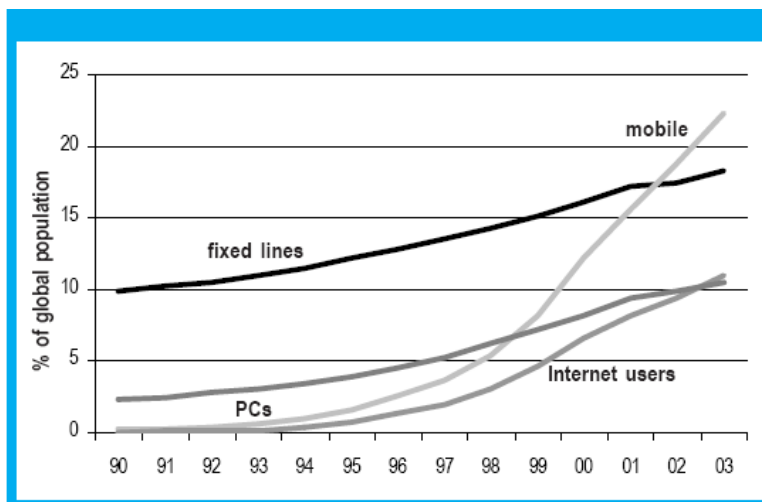


Figure Three – ITU statistics of the global penetration of communications technologies (Source: Sciades et al, 2005:9).

⁶ China has higher internet penetration rates than many countries with the same GDP per capita, mainly as a result of government prioritisation of the development and modernisation of the communications sector (see Sciades et al, 2005 for more detail).

⁷ The term 'internet penetration rate' is used to describe the percentage of a population who use the internet.

Box One – Obstacles to internet penetration in Africa

Levels of internet penetration in African countries are amongst the lowest in the world as a result of the configuration of political, economic and social factors that underlie the African NCE. Owing to the small size of local African internet networks, the owners of international internet backbone (the international networks that provide connections between national and regional networks) have little incentive to interconnect with African service providers, charging them disproportionate access costs. This is exacerbated by the fact that international connections from Africa rely on more expensive satellite transmission due to the absence of physical cable networks (ACP, 2003). Whilst liberalisation of the telecoms sector with a view to reducing the monopoly of incumbent operators is underway in many African countries, the process is slow, partly owing to the large amount of revenue that state-ownership of the companies brings in for cash-strapped governments. This has hampered the onset of competition in the sector that would drive down the cost of access for consumers and create incentives for the building of new infrastructure. In countries where competition in the telecoms sector exists, incumbent operators have often retained control over the international access point to the telecoms network, enabling them to charge internet service providers (ISPs) higher prices for access to the international internet backbones. These factors have combined to make internet access geographically limited and too expensive for most people.

In a bid to help African internet providers access the international backbone, a consortium of telcos invested in an intercontinental submarine fibre link which links eight countries on the West coast of Africa to backbones in the Far East and Europe. However, members of the consortium have retained a monopoly on access to the backbone, maintaining high prices for access by local ISPs and thereby doing little to lower prices for internet users across the continent. Stakeholders involved in the planning of a similar link along the East coast of Africa are concerned to prevent a similar situation, for example through implementing innovative public-private sector partnerships to ensure competitive access to the network and prevent its monopoly control by incumbents.

(Unless otherwise stated, this case study draws on information from Jensen, 2005a&b.)

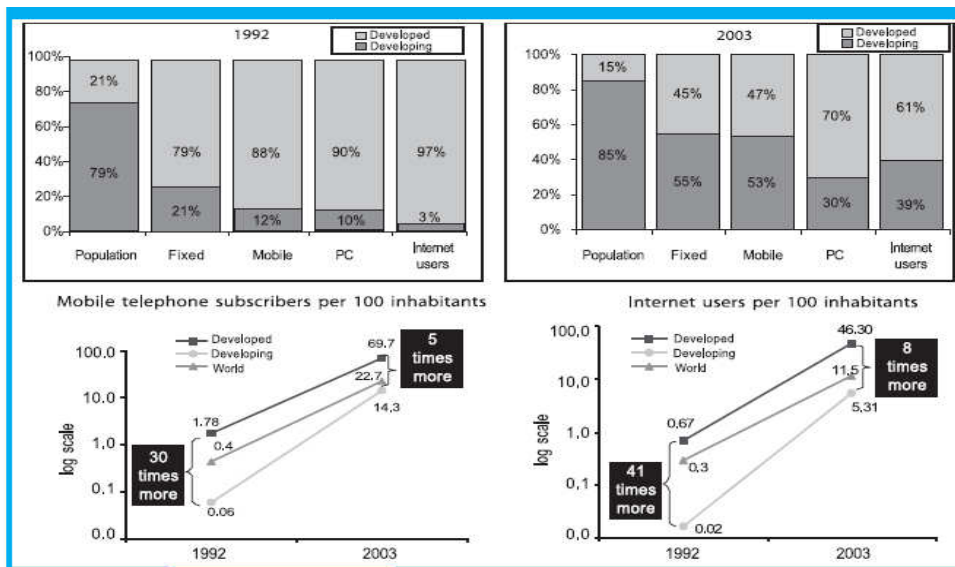


Figure Four – ITU statistics of the global digital divide (Source: Sciades et al, 2005:11)

Box Two – The political and regulatory factors underlying differentials in broadband penetration between East Asia, the USA and Europe

Broadband penetration rates have been higher in many East Asian countries than in the USA, and lowest in many European countries. High levels of penetration in South Korea and Japan can be attributed to intense competition between innovative incumbents and new market entrants. This has in turn been facilitated by political intervention in terms of direct subsidies for the development of networks and 'unbundling' regulation (common carrier regulation that requires incumbents to allow competitors to use their networks at low prices). Faced with aggressive competition, incumbents have been active in implementing faster internet technologies such as broadband and laying optical fibre networks which overcome traffic bottlenecks in the 'local loop' (the part of the network that connects individual homes or office blocks to core local or national networks). The development of broadband specific applications such as Voice Over Internet Protocol (VOIP) and computer games has also been more active in East Asia than in other parts of the world.

In contrast to the high levels of competition in the provision of broadband in East Asia, the USA market is dominated by a small number of large telcos and cable companies. Pro-incumbent regulatory policies have mandated that, as an inter-state rather than local or state level information service, cable broadband providers are not required to permit other companies to use their networks to provide internet services. Since the 1996 Telecommunications Act, local telcos have been subject to common carrier obligations but, in response to the exemption of cable networks from unbundling obligations, began to lobby for a change in the regulatory framework. They argued that common carriage obligations removed their incentive to invest in new internet technologies and infrastructure such as fibre optic cable. From 2003, the US regulatory body, the FCC, began to reverse the gradual unbundling that had been undertaken since 1996. This effectively reduced levels of competition in internet provision between the incumbent telcos and new facilities-less entrants to the market, but the incumbents have thus far done little to fulfil their promises of improved internet access for customers despite deregulation.

In contrast to the USA, many European telecoms markets have until recently had very low levels of competition. In many countries, legislation designed to reduce the power of incumbent telcos has failed to do so effectively. For example the regulatory requirement that BT in the UK had to wholesale lines to competitors had little overall impact on levels of competition as BT retained a monopoly over the wholesale market, and BT Wholesale was able to give preferential access to the BT Retail arm over other competitors.

The unbundling of networks has been very slow in Europe, but, following the successes of South Korea and Japan, unbundling has recently increased, accelerated by EU regulatory directives. Competition and broadband performance has increased in many countries as a result, with France leading the way from 2002. However, many countries are still unable or reluctant to reduce the power of incumbent operators, for example with Germany provoking anger at the EC for ruling that the incumbent Deutsche Telekom does not have to allow competitors to use the new high speed networks it is currently rolling out (Telegeography 18/12/06).

(Unless otherwise stated, this case study draws on information from Fransman et al, 2006.)

The case studies outlined in Boxes One and Two illustrate the influence that politics and regulation can have on the uptake and spread of new technologies. Commercial innovation driven by competition between companies is also a major factor. It was at

least in part the desire of US telcos to compete in the provision of television services in the 1980s that drove the invention of Digital Subscriber Lines (DSL)– technology that enabled the faster transmission of digital data over the telephone network, and that is now used for broadband internet access. However, due to a lack of consumer demand, the technology was not widely used until the new millennium when internet use had proliferated across the world and there was a market for new high speed, permanent internet connections. Thus, economics, markets and business models also play a large role alongside politics and regulation in both the development of new technologies and their adoption by users.

In addition to divides in levels of access to communications technology between countries, significant divides also exist within countries, for example along rural/urban, age, gender, disability, class/income and ethnic lines. Many of these divides are related to underlying socio-cultural inequalities and cannot be expected to automatically disappear with the development and deployment of new technologies. Huyer et al. (2005) show how this is particularly true for gender divides in access to, and use of, communications technology. For example, Figure Five illustrates that gender divides in internet use exist across the world, and whilst the divide is more pronounced in developing countries, it does not automatically close as overall internet use increases. The gender divide has closed in the USA and Canada, but significant divides persist in Norway, the UK, the Netherlands, Germany and France despite increasing levels of overall internet use (Huyer et al, 2005). In contrast to persisting gender divides in these richer countries, the proportion of female internet users has overtaken males in a number of poorer countries with lower levels of overall internet penetration, including Thailand, Mongolia and the Philippines (Figure Five). The reasons for these differences are country-specific and related to underlying differences in socio-cultural factors such as gender inequalities in literacy, employment and language skills, along with perceptions of the status of women and their relationship with technology. For example, Huyer et al (2005) relate the apparently anomalously high levels of internet use amongst women in Mongolia and Thailand to the promotion of women's education by the government and the high levels of female enrolment in tertiary education, and in the Philippines to the widespread knowledge of English. Inequalities in access to technology within countries are thus affected by a range of factors, including government policy which is in turn underlain by social/cultural norms and values. The development of new technologies alone can therefore not be expected to overcome digital divides.

In summary, this section has outlined how politics, regulation and market demand interact to affect the invention and adoption of new technologies amongst different populations. It has also shown how an array of social and economic norms and values that underlie the political and market drivers of change also affect levels of access to technology. Important examples include the effect of national differences in economic theory on approaches to broadband regulation and the effect of social norms and policy on the gender digital divide. New technologies are constantly being developed, but digital divides in internet access are persistent. Thus, in order to understand and address 'digital divides' in internet access across the world, analysis of the drivers of change that underlie specific distributions of technology is vital.

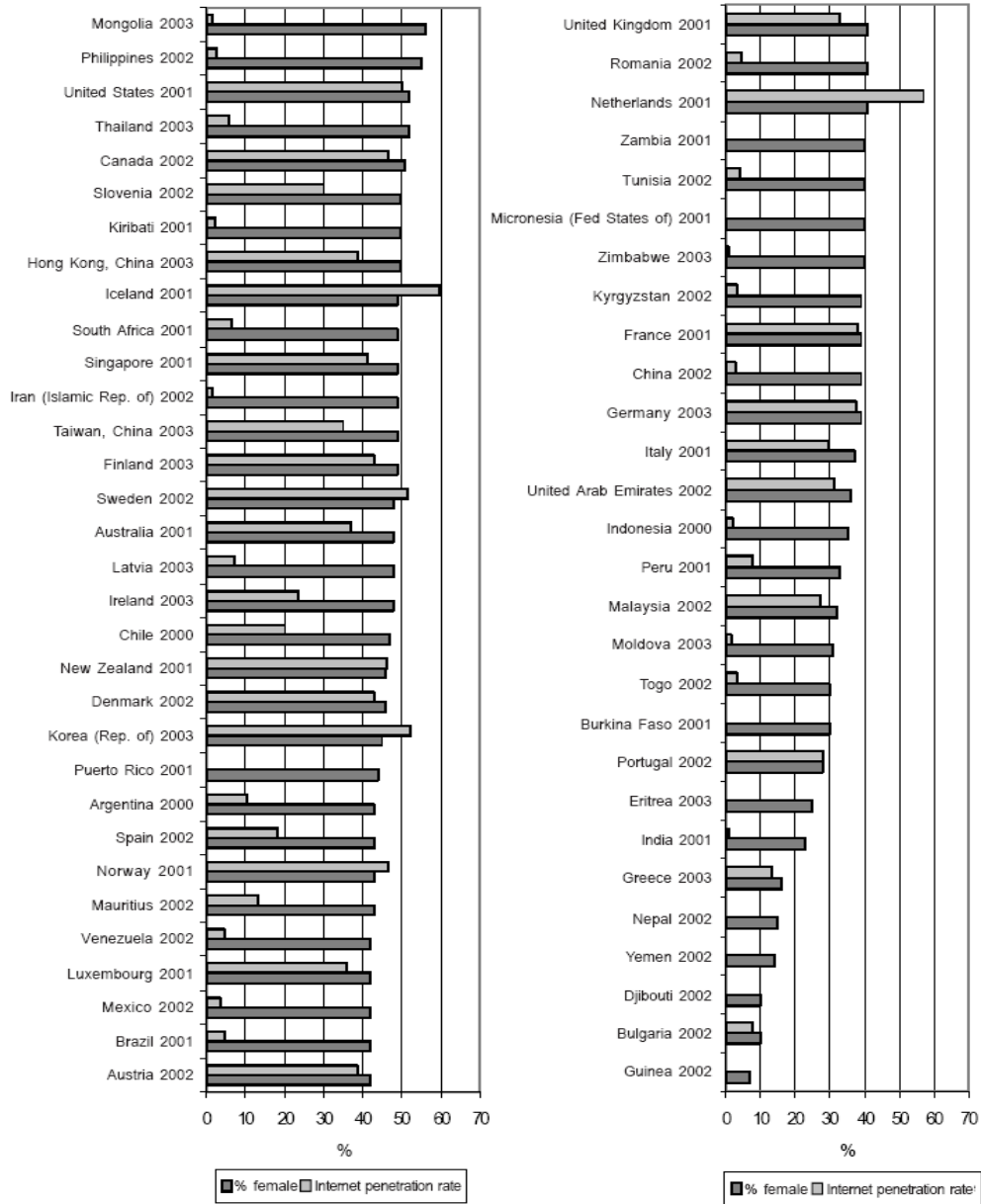


Figure Five - ITU statistics of female internet use as a proportion of overall internet penetration in selected economies (Source: Huyer et al, 2005:143)

4.2 - Drivers of change in the spread of wireless communications technologies: mobile phones, mobile internet and wireless internet

As Figure Four in the previous section shows, mobile phone growth has expanded dramatically across the world since the late 1990s, and a higher percentage of mobile phone users reside in developing than developed countries. The proportion of people who subscribe to mobile phones in developing countries is still much less than in developed countries, but this gap is closing and is smaller than for the internet (figure Four). Whilst this is a positive trend, many countries still have low penetration rates and networks that are less developed than would be expected for their level of GDP. For example, only 3% of the populations of the DRC, Ethiopia and Lao use mobile phones (Sciades et al, 2005). Box Three outlines some of the factors behind the relatively rapid diffusion of mobile phones in developing countries. Disparities in mobile phone penetration between countries with similar incomes are often the result of variations in these factors.

The relatively rapid penetration of mobile phones in countries and areas that are not served by wired infrastructure in developed and developing countries has led many to speculate about the potentials of increasing wireless internet access via the phones. In the 21st Century, 3G ('third generation') technology has facilitated access to the internet via mobile phones at broadband speeds in more developed countries around the world. Uptake of this technology has been faster in Japan and Korea than in Europe and America, partly as a result of the high licence fees paid by mobile phone companies in the West effectively limiting the amount they could invest in infrastructure, and also due to the different marketing and business models they adopted⁸. Following the success of 3G in East Asia, 3G networks and business models are currently being redeveloped in many countries where previous rollouts failed to stimulate user demand. For example, the company 3 has recently launched the X-series phone in the UK which gives users access to unlimited internet browsing for a fixed rate. Partnerships between 3 and other companies give users access to additional services including free VOIP calls and mobile TV, whilst new technology from Yahoo converts all websites into a format that can be viewed over the mobile phone interface, giving users access to all of the internet rather than just selected content (CNet, 30/6/06). Many networks are also being upgraded to HSPDA, a faster 3G technology.

Problems concerning pricing and access to internet content are thus being ironed out in more developed countries, and take-up of 3G is increasing. However, the difficulties experienced with the roll out of 3G suggest that it may not provide an immediate solution to the digital divide between poorer and richer countries. 3G networks have not yet been built in most developing countries, which are still focussing on the roll out of 2G ('second generation') networks providing voice and basic data services such as SMS. Where networks have been built, 3G is often not available as part of the pre-pay pricing option chosen by most mobile users, and affordable handsets upon which many users depend are not equipped with 3G capability (WSIS, 2005). The use of 3G data cards which provide computers with broadband access may offer solutions for potential internet users

⁸ These included Western companies placing too much expectation in consumer demand for mobile video content, and, in Japan, the provision of open access to the internet coupled with the formation of partnerships between content providers and phone companies to give users assurance that a select number of sites would adhere to certain standards, such as the absence of adverts. For more information, see Baker and Megler (2001).

Box three – Drivers of mobile phone penetration in developing countries

Market

- Demand – Cash-strapped and uncompetitive fixed-line telecoms sectors dominated by state monopolies failed to meet the pent up demand for phone lines in many countries. There was therefore a huge market for mobile phones and a rapid take-up of the technology.
- Business models – The introduction of pre-paid services and charges for only the caller rather than the receiver of phone calls dramatically increased mobile phone use amongst poorer people in many countries. The absence of caller-pays pricing can result in low penetration rates for mobile phones, for example in Sri Lanka where lobbying pressure from fixed line telephone providers prevented the government from abolishing charges for receiving phone calls (Gunawardene, 2005).

Technology

- Cost - The lower relative cost of mobile compared to fixed-line infrastructure facilitated the rapid roll out of networks.
- Standards – in many countries, government or corporate agreements to adhere to one mobile phone standard in many countries stimulated the market through increasing economies of scale, facilitating interconnection between different providers and enabling operators to keep up with global developments in technology. The failure to decide on sector-wide standards has undermined mobile phone penetration in some countries, for example with the adoption of two standards in contributing to relatively low penetration rates compared to other African countries (Gillwald, 2005).

Politics

- Subsidies - In many countries the government encouraged the development of the mobile phone market, for example through the elimination of taxes on mobile handsets in Kenya (Gillwald, 2005).
- Competitive markets – Mobile phones appeared on the market at the time when many governments were undertaking or considering the liberalisation of telecoms in the late 1990s. Many governments therefore gave licences to two or three operators, keeping competition at a level that helped bring down prices for users but also guaranteed markets for operators, giving them the incentive to invest in infrastructure.
- Regulatory structures - Many of the countries with high mobile phone penetration rates have 'modern' regulatory frameworks in place, including the separation of regulators from the operators of the networks. Sciades et al (2005) attribute the relative underdevelopment of the mobile network in Ethiopia partly to the presence of a state owned monopoly and the lack of separation between telecoms regulation and operation.

(Unless otherwise stated, this information is drawn from Sciades et al, 2005).

hampered by the absence of fixed line access in areas covered by 3G networks, but the high cost of PCs will remain as a barrier to many. Thus, whilst governments should make the frequencies available for 3G networks and allow operators to upgrade networks using their current spectrum allocations (WSIS, 2005), 3G cannot be expected to provide an immediate or unproblematic solution to digital divides in internet access. Moreover, mobile phone users are unable to engage in hardware and software engineering and programming in the same way as PC users as the technologies are

closed and often proprietary. Internet access via mobile phones may therefore increase the amount of information available to users, but would exacerbate the digital divide in areas of innovation and research and development.

Besides 3G, other wireless technologies are currently being developed that may have the potential to increase internet access to currently underserved populations. WiFi hotspots ('clouds' of wireless internet access to which internet users can connect for free or through paying a fee to the service provider) are being rapidly developed in many areas to give internet access in airports and restaurants, and many incumbent telcos are offering wireless services as part of their internet packages (Fransman, 2006). Many commentators are particularly hopeful about the potential for another wireless standard, WiMax, to give internet access across much wider areas of up to 10 kilometres, and to provide interconnection between WiFi hotspots. Whilst this may help with access in remote areas, questions still exist about the cost of access to PCs, about the competition WiMax enabled technologies will face from 3G and about whether mobile and static versions of the standard will be compatible (OECD, 2006).

4.3) Convergence around Internet Protocol

Currently, a number of different transmission technologies are used to transmit communication signals in the connectivity and code layer of the NCE. These range from digital voice switching in telephone networks to analogue and digital radio waves in the broadcasting sector. However, a process of convergence around internet protocol (IP) is starting to occur in which communications companies operating in different sectors of the NCE are starting to use IP as a means of transporting data. Some argue that this convergence in the connectivity and code layer will result in convergence in other areas of the NCE, for example with the same networks transmitting communication signals for the voice, television and internet sectors, and the same piece of end-user equipment being able to receive and de-code these signals. This in turn would promote corporate and service convergence as a single company could provide a range of services previously supplied by different companies in different sectors in the communications industry. This section will briefly discuss the extent to which this is actually occurring, and some of the implications it would have for freedom of expression in the NCE.

The idea that digitalization will result in the convergence of communication platforms and businesses is not new (Mueller, 1999). However, the recent proliferation of high speed internet-based technologies and the increasing dominance of IP in the connectivity and code layer of the NCE have introduced a new sense of immediacy to the debate. Wilksch and Shoubridge (2001) describe how IP has emerged as the transmission technology of choice for telcos upgrading their networks, largely a result of the growing tendency for businesses to use IP networks for internal voice communication to take advantage of its lower cost. A study by IDC (2005) found that 28% of businesses in the UK were using converged voice and data services by December 2005 and predicts that 74% of companies will have switched their voice communications to IP by 2008. In addition to this, broadband technologies and networks that allow for the transmission of data by IP at higher speeds are prompting companies in the NCE to look for ways to build the streaming of sound and video into their business models, for example with telcos, broadcasters and ISPs starting to offer television via IP (IPTV) and video on demand services, sometimes as part of a bundled 'triple-play' package of voice, internet access and IPTV.

The digitalisation of content and convergence around IP in the connectivity and code layer of the NCE is arguably resulting in a degree of convergence in other layers of the NCE model. For example, in the physical layer, some large telcos are starting to build 'next generation networks' (NGNs), a process which is currently being led by BT's '21st Century Network' in the UK. NGNs are converged networks - multi-service platforms that are capable of replacing existing incumbent voice and data switching and routing platforms, allowing for the delivery of all services over a single network (Valdar, 2006). This will likely spur convergence in end-user equipment, although this process has already begun. For example converged telephone handsets now enable users to make both mobile phone and fixed-line calls through switching seamlessly between mobile networks when outside of the home and wireless internet networks when in the home. However, whilst a degree of convergence in the equipment and services available to consumers is occurring, this is likely to be limited by user demand for different equipment to perform different functions. For example, mobile internet is useful whilst people are on the move, but will not replace internet access via PCs due to their larger user interfaces and wider functionality which includes programming and access to a wider range of software⁹.

Full convergence between networks would require interoperability between different types of end-user equipment. For example, in order for a particular brand of mobile phone to be able to communicate with a different brand of mobile, a land-line or a PC via a converged network, all must be able to decode the information sent by the other piece of equipment. However, the full convergence of networks and interoperability of equipment may not be in the economic interests of companies acting in different segments of the NCE. For example, Stewart (2004) addresses the question as to whether the development of wireless technologies based around the PC will complement or compete with those based around mobile phone handsets. Tensions between the two sectors exist as, whilst the internet thrived on open standards and free access, telecommunications, including mobile phones, have developed as centralised and highly controlled and regulated industries. Mobile phone companies may seek to retain their own customer base through improving mobile phone functionality based around closed standards rather than investing in interoperability that could see them lose customers to other industry sectors. Similar debates are arising over whether incumbent telcos can be expected to invest in converged networks if regulation requires them to allow their competitors to use the new networks at low cost in the interests of competition. In this case, network convergence would not necessarily be in the interests of incumbent telcos as it would effectively allow for the more efficient transport of high-value content across the network by competing companies without the owners of the networks being able to capture this value and recoup the costs of their investment in the network¹⁰. Thus, interoperability, and network and equipment convergence, are not guaranteed to occur.

Whilst interoperability and convergence are by no means guaranteed, incumbent telcos in many more developed countries are already investing in converged networks. It is

⁹ Exceptions to this may occur in poorer countries where the availability of converged end-user equipment would reduce the user-costs of accessing a variety of communications technologies. As mentioned in section 4.2, widespread hopes exist that improved access to the internet via mobile phones will help to overcome the digital divide between more and less developed countries through giving internet access without the need for a PC.

¹⁰ This issue is related to the net neutrality debate which is discussed in section Five.

likely to be in the business interests of equipment manufacturers and service providers to invest in some form of interoperability so that they can take advantage of the faster and more efficient transport of communication signals that these networks will facilitate, and so they can compete in the provision of converged services if these are met with consumer demand. As mentioned above, interoperability requires actors using shared networks to adhere to common standards so that different types of end-user technology can communicate with each other. Whether these standards are closed or open may affect the nature of the converged technologies that develop, including their functionality and accessibility. Closed standards are usually developed by individual companies and are often proprietary in that their use is protected (by copyright, patents etc) and controlled by their owner for the purpose of making profit. In contrast, open standards are democratically and collectively designed by stakeholders and are available for all to both develop further and to build a variety of different hardware and software for (Struble et al, 2005). Often, a closed proprietary standard can become the de facto standard for an industry if the products that use it are successful and dominate consumer markets. This gives the owner of the standard power to shape the direction of change in the development and use of new technologies in that sector. This applies both to companies and governments. For example, analysts fear that if China develops its own standards for communications technologies it will have a significant impact on technological standards globally owing to the country's huge market power. Of particular concern has been China's threat to demand that its own closed standard for WiFi be incorporated into devices sold in its country which would facilitate government surveillance of WiFi internet users (Goldsmith and Wu, 2006).

The open standards movement emphasises the importance of open standards for fostering competition, innovation and development, particularly to ensure that markets and opportunities to innovate are open to developing countries (see Struble et al, 2006). It is for this reason that the Brazilian government is currently investing in the use and promotion of open-source hardware and software. Thus, in terms of the implications of standards for convergence around IP, if convergence occurs around closed and proprietary standards, the functionality of the resulting technologies may be limited and controlled by the governmental or corporate owners of the standard. Convergence around open standards would have more positive implications for freedom of expression in terms of fostering innovation and the interoperability of a wider range of end-user technologies.

This discussion has shown that, whilst a degree of convergence around IP is occurring, it remains to be seen as to whether full convergence between networks and equipment will become a reality. Either way, there will be important implications for the shape of the NCE and the right to freedom of expression. Convergence could increase user access to information that is currently only accessible via separate communications platforms. In the arena of content diversity, convergence could increase the number of outlets available for different types of content and increase competition between content providers (for example through allowing ISPs to compete with cable and broadcast companies in the provision of television services), thereby increasing user choice and access to different types of content. However, as the sophistication of technologies increases, users are likely to demand secure, simple and useable equipment, and a trade-off may exist between the use-ability of technology and its openness and programmability to allow for future innovation (Zittrain, 2006). The types of standards used in converged technologies will also have important implications for the shape of the NCE. If convergence occurs around closed and proprietary standards, the implications

for freedom of expression could be severe, as illustrated by the Chinese attempt to push for its own WiFi standard. To conclude, the process of convergence around IP will depend on the interplay between technological change, regulatory measures and the success of open standards business models. The eventual outcome is likely to have a significant impact on the nature of the NCE and the direction of future change, and therefore on the right to freedom of expression.

5) Trends and Dynamics – Governance, politics and regulation

The above sections have already touched upon the various ways in which national and international government and regulatory bodies influence the actions of stakeholders in the NCE, thereby shaping its nature. The overall aim of most regulation in the NCE is to mediate between the interests of different stakeholders who have different conceptions of the environment and how it should be used. Regulators therefore act to shape the NCE according to a set of values, some of which may relate to the economic development communications networks and others to how these networks are used and the nature of the content that flows across them. This section explores overall trends in regulation of the NCE at global, regional and national levels as well as the economic and social norms that influence this regulation. It also examines some of the tensions faced by regulators in trying to mediate between different stakeholders and ideologies. These include tensions between openness and security, and between the maintenance of competition in the provision of communications services and the provision of incentives for large companies to invest in new technologies.

5.1 – The transnational regulatory regime: Convergence and liberalisation

At the global level, trends in the regulation of communications have pointed towards liberalisation and deregulation, governed by converged regulatory bodies responding to processes of convergence around the internet and IP. Many countries including the UK, Taiwan and Malaysia have recently merged regulatory bodies that were previously separate and responsible for different sectors of the communications industry. For example, in the UK a new regulatory body, Ofcom, was created in 2003 which assumed responsibility for the economic, technical and cultural regulation of all electronic communications, replacing five organisations that had previously regulated telecommunications, television, broadcasting standards, radio, and radio communications separately. A similar trend is occurring at regional and international levels. The numerous bodies and stakeholders that currently assume responsibility for different aspects of internet governance are currently undertaking discussions about how best to regulate and govern the international NCE under the banner of the Internet Governance Forum, an outcome of the UN World Summit on the Information Society (WSIS) process (for more information see IGP, 2004).

Whilst regulatory convergence can increase the efficiency and coherence of regulation, some activists concerned with maintaining the openness of the internet fear that it will result in the transfer of strong regulatory measures that were applied to the broadcasting and old telecoms industry to the internet, thereby restricting its potential to foster new and free communications spaces. Examples of this occurring include the EU's proposed 'internet without frontiers' directive and the World Intellectual Property Organisation's (WIPO) proposed broadcasting treaty which is discussed further in section 5.3. However, as discussed in section 3, on the whole global trends in regulation since the 1980s have been towards the liberalisation of media and telecoms markets, with reductions in government intervention and regulation. Whilst this obviously varies between countries and regions, the overall trend emanating from the West is that regulation should only occur to foster competitive markets that provide consumers with choice and low prices, and sometimes to ensure that access and content adhere to public interest standards. According to this regulatory regime, the regulation of emerging networked communications markets is often seen as necessary, but once

competition has been established and the industry is considered to be well-developed, regulation should be withdrawn or kept to a minimum (see for example EU eCommunications, 2006; Ofcom 2004).

Commentators suggest that this process of deregulation and liberalisation is increasing the power of big business in relation to smaller companies and governments, and that public interest concerns such as universal access and content diversity are being neglected. This is particularly apparent in the media content layer of the NCE. Whilst the notion of public service media and regulation to meet social obligations is still strong in many countries, particularly in Europe, trends in what Bennett (2004) refers to as the transnational media regime point towards a commercialisation and related 'dumbing down' of media content, exacerbated by a concentration of media ownership amongst global media conglomerates (for further discussion of these trends, see the Global Partners *Contemporary Communications Environment* report). Authors in *The Case Against Media Consolidation* (Cooper, 2006) illustrate the negative impacts that media ownership concentration is having on media diversity in the USA, and a recent study by the Future of Music coalition investigates the ways in which the consolidation of radio stations is resulting in dumbed-down and increasingly restrictive radio content in the USA (Future of Music Coalition, 2006).

The situation is slightly different in the physical layer of the NCE. The impact that variation in government regulatory approaches has had on internet penetration and the development of new internet technologies in different countries was discussed in section 4.1. On the whole, transnational trends point towards the unbundling of networks and the curbing of the power of incumbent operators. However, there are notable exceptions with the USA debate over net neutrality providing a salient example. The biggest telcos and cable ISPs in the USA have been lobbying the government to allow them to prioritise certain packets of data travelling along their networks, based on fees paid to them by content providers wishing to ensure their content reaches users faster than that of their competitors and other producers. This would undermine what some argue to have been a founding philosophy of the architects of the internet - that the network should remain open with equal opportunities of use and access for all users (see for example Lessig, 2001; Goldsmith and Wu, 2006). In what is seen by activists as a success in campaigning and lobbying by civil society, bills that would undermine net neutrality have thus far been blocked (for more information see www.savetheinternet.com). However, the net neutrality debate raises a number of important questions which can get sidelined by those concerned with protecting the openness of the internet, including whether different types of data should be given priority on the net, for example that containing voice data packets to maintain the quality of service of VOIP, and how best to give companies incentives to invest in new technologies and networks. The net neutrality debate provides insight into the difficulties faced by regulators trying to mediate the interests of stakeholders in the NCE who have different conceptions of the environment and use it for different purposes.

5.2 – Tensions in the regulatory regime: liberalisation versus security

One of the main tensions that governments are facing in their attempts to regulate and govern the NCE is between preserving communication and market freedoms on the internet whilst at the same time addressing security concerns which have become particularly salient during the ongoing 'War on Terror' and its associated climate of fear.

The NCE is often seen as the source of a potential threat to security as it offers a powerful organisation and communication tool for subversive groups. However, new technologies and regulation of ISPs also provide governments with a means of increasing surveillance of these groups and restricting access to communications deemed not in the public interest.

The trend of increasing government restrictions and surveillance on the web is global, from the shutting down of websites that discuss euthanasia in South Korea to laws that require ISPs to hold information about their customers in Europe and America (Privacy International, 2003). Many countries that heavily censor traditional media content have until now been less concerned by internet content. However, as physical internet access increases and internet content in languages other than English grows¹¹, there is a concern that these countries will adhere to the global trend of increased restrictions (ibid). Dynamics concerning the restriction of internet communications are discussed further in the Global Partners *Contemporary Communications Environment* report. The latest controversy in the USA has been the admission by the US government that it has been using an Automated Tracking System for several years, a system that makes risk assessments of the potential for US citizens travelling in and out of the country to engage in terrorist activity without disclosing to individuals what personal risk score has been calculated for them (EFF, 19/12/06).

5.3 – Tensions in the regulatory regime: liberalisation versus intellectual property

A further tension faced by bodies regulating the NCE exists between protecting incumbent corporate interests with the overall aim of ensuring that markets are strong and promote economic growth¹² whilst at the same time limiting the power of large companies to ensure that they do not stifle competition and innovation. Many activists argue that legislation in the USA has tended to cater to the interests of big business rather than consumers, for example with reductions in ownership restrictions and the approval of mergers that have resulted in the domination of the NCE by huge conglomerates (discussed further in section 6).

One area in which this trend is playing out is that of IPR, with the current dominant regulatory regime tending to favour the protection and extension of property rights. This tends to be in the interests of the media and software giants that dominate the content and applications layers of the NCE, and critics argue that there has not been adequate consideration and analysis of the impact that this will have on innovation and continued economic growth (IPPR, 2006). The main international regulations concerning IPR in the NCE are the 1994 WTO TRIPS agreement and the 1996 WIPO 'Internet Treaties' which renew and update the Berne (1881) and Rome (1961) Conventions. The WIPO

¹¹ Freedom of expression advocates are keen for internet content to be multilingual and therefore available to all users. However, if this results in increased restrictions being placed on internet content by authoritarian governments, unforeseen trade-offs for freedom of expression may exist between linguistic diversity and access to information.

¹² There is also truth in the argument that governments legislate in the interests of big business owing to the political and economic power that they hold. Whilst larger companies have more resources and political power for lobbying, the success of the net neutrality campaign in the USA to raise awareness of issues amongst regulators and encourage them to act according to public rather than private interests suggests that it is not always a simple case of governments being ruled by the political and economic clout of companies.

treaties have been controversial amongst free expression advocates. For example, they give authors of digital content the right to protect it using encryption technology (digital rights management or DRM) and prohibit the circumvention of this protection by users. This has been incorporated into national legislation in many countries, such as the controversial Digital Millennium Copyright Act in the USA which places the power over the distribution and use of content firmly in the hands of corporate players (Gross, 2006). Negotiations currently underway at WIPO over a proposed Broadcasting Treaty are equally controversial. Intended to prevent signal theft of broadcasts, the treaty includes proposals to give broadcasters unprecedented rights over the content of their broadcasts, even if they do not own the rights to the content or if it is in the public domain. Some advocates of the treaty are proposing that it should cover internet content, including podcasts. Activists are concerned that this will undermine fair use provisions and have a detrimental impact on free speech, and telcos are concerned that it would hamper the rolling out of new technologies such as home networking which requires the re-transmission of signals in the home. Whilst intense disagreement over the proposals have postponed further discussion until autumn 2007 and have shifted the approach towards emphasising the protection of signals rather than the rights of broadcasters over content, there is still a danger that a treaty will be passed that hampers free speech and innovation in the name of protecting the commercial interests of media conglomerates (EFF, 10/06).

Whilst the trends have been overwhelmingly pointing in the direction of using IPR to entrench corporate power over the past decades, actors wishing to reign in the use of IPR and ensure that they are used in the public interest have recently gained some ground in the struggle. The insistence by more developed countries that their trade partners adhere to stringent IPR standards, often going beyond those laid out in international treaties, has been increasingly seen as a means of economic and cultural imperialism by poorer countries. As net exporters of cultural and scientific products, IPRs benefit richer countries disproportionately, placing a high premium on the distribution and consumption of western media content which is in high demand across the world. Foreign music, films and television programmes often face little competition from local content producers in developing countries who, under the terms of trade agreements, governments are often unable to support and protect. For example, the South Korean government announced in 2006 that it would reduce its support of the Korean film industry after lobbying from the American film industry during bilateral trade negotiations. The Korean government is still under pressure to abandon its quota system which requires theatres to show Korean films for at least 73 days a year (IHT, 26/01/06; Seoul Times 20/12/06). However, less developed countries have been pushing back against these trends in recent years, and in 2004 Argentina and Brazil were successful in lobbying for the establishment of a Development Agenda at WIPO. Whilst the organisation's mandate has traditionally been to promote intellectual property, the Development Agenda forces it to consider the needs of developing countries in its promotion, including the use of IPR as means of development rather than solely as ends in themselves. Further evidence that the tide may be turning against the indiscriminate use of IPR to protect the interests of big business comes from the recent acceptance of the UK government of the Gowers report which advised against the extension of the terms of copyright for music producers in light of inadequate evidence of the benefits it would bring and the difficulties of enforcing current copyright provisions in the digital age (see the www.openrightsgroup.org for more details).

6) Trends and Dynamics – Business models and markets

This section explores how businesses are responding and adapting to change in the communications environment and how this in turn is impacting on its shape . It also considers the role of the users of communication platforms in shaping both markets and the overall nature of the NCE.

6.1 – How incumbent companies have responded to the development of the Networked Communications Environment

The NCE has had a substantial impact on **telecommunication companies**, forcing them to adapt to new technologies, sources of competition and consumer preferences. However, figures suggest that the most powerful telcos have been largely successful in adapting to the new environment through using new technologies to gain competitive advantage and enter new markets. For example, whilst revenues from fixed-line telephony are static or declining in most OECD countries, overall telecoms revenues increased 10% between 2002 and 2004, with growth deriving mainly from the broadband and mobile phone sectors (OECD, 2005).

Despite increasing regulation to foster competition in the provision of telecoms services in many countries, old incumbent telcos are still dominant in most economies. They have maintained this dominance partly through mergers and acquisitions, and this has been particularly notable in the USA. The Free Press Movement warns that recent mergers represent the stitching back together of ‘Ma Bell’, the telecoms monopoly AT&T that anti-trust laws split up into regional operators (the ‘Baby Bells’) in 1984. For example, In 2005, mergers between telcos created telecom conglomerates that have a 90% market share in residential local fixed line telephones, a 70% share in long distance phone lines and a 40-50% share of the USA wireless market (Consumer Federation, 2005). Telcos have also diversified the services they provide in order to maintain market power: offering ‘triple-play’ services including video, for example, as discussed in section 4.3. Incumbent telcos in many countries are currently investing in high speed fibre networks to maintain their competitiveness, raising concerns amongst regulators and campaigners about whether these networks can and should be subject to common carrier and net neutrality obligations, as discussed in section 5.1.

In the content layer of the NCE, commentators suggest that the internet thus far has had little impact on the consumption of **traditional media**, although there is some speculation that the internet has been the cause of declining circulation sales and falling television audiences amongst young people in more developed countries (WAN, 2006; the Economist 25/08/06). However, on the whole, people tend to use the internet as a supplement to traditional news sources. Those who do use it as a source of news tend to visit sites owned by traditional media companies such as Fox, CNN and the BBC or news portals such as Yahoo and Google which aggregate news from traditional sources (Pattersen, 2006; Cooper et al, 2006). Whilst the development of the NCE has resulted in the restructuring of newsrooms and news production companies across the world (see for example BBC News, 14/07/06; Hammersley, 2006), the traditional news industry has been successful in preventing the mass migration of audiences away from their outlets,

in part through encouraging citizen journalism and blogging¹³. The overall picture is not clear cut and varies between countries, but the evidence suggests that the media companies that dominated in the era of mass media are successfully adapting to the changes of the NCE.

Music and film companies have been very concerned about the impact of the internet on their business models, as reflected in their drive for increased protection of copyright and the use and protection of digital rights management (DRM). The December 2006 Gowers report, a review of the intellectual property system in the UK, estimated that record companies are losing up to 20 percent of their annual turnover to piracy and counterfeiting. Global sales in the music industry, including both physical and digital formats, fell by four percent in the first half of 2006 (IFPI, 2007). However, an article in the Economist (28/10/04) estimated that up to three quarters of recent falls in record sales in the USA have not been related to internet piracy but to other factors, such as the failure of the music industry to develop durable artists capable of generating sustained sales.

Whilst the value of global sales of physical formats (CD and DVD) fell by nearly seven percent in 2005, sales of digital formats rose by 188 percent, leading the IFPI to declare that 'Digital formats continue to drive the global music market' in its 2005 World Sales press release (IFPI, 2005). Based on a survey in the UK and Germany, the IFPI declares that more internet users are now downloading music legally than illegally (6% versus 5%) due to a series of court judgements against copyright infringers in late 2005 and out of court settlements with peer-to-peer file sharing networks such as Kazaa (IFPI, 2006a&b). This evidence suggests that, whilst the record industry has not yet managed to fully offset falls in music sales in physical formats with digital formats, it is starting to win its fight against copyright infringement on the internet and to make up declining revenues from physical sales with revenues from digital sales. This is expected to continue as mobile phones are increasingly used as portable MP3 players (IFPI, 2006).

The music and film industries also appear to be creating modified business models that adapt to the new business environment of the NCE. There has been a trend for powerful traditional and new media companies to buy up successful independent internet content providers: for example the recent acquisition of YouTube by Google and MySpace by News Corporation. In these cases, media companies have started to find new ways to address the issue of copyright infringement in the digital environment. For example, YouTube recently signed what has been hailed as a landmark deal with Warner Music, with YouTube agreeing to commercially distribute Warner's music video catalogue, and both companies sharing in advertising revenue from these videos and from user-uploaded videos that incorporate audio material to which Warner Music holds the rights (YouTube press release). Content companies are also seeking to make formal relationships with peer-to-peer sites rather than simply engage in direct battles over IPR in the courts (see for example BBC News 20/12/06).

This discussion suggests that although many incumbent companies operating in the communications environment have been challenged by the changes associated with networked communications, on the whole they are successfully adapting and are starting

¹³ For example, Nielsen Netratings (2007) reports that the web traffic to the blog pages of the top 10 online newspapers grew by 210 percent between 2005 and 2006, whilst the overall traffic to their sites increased by just nine percent.

to see increases in revenue as a result. Broadband and mobile revenues are driving the telecoms sector, traditional media brands have successfully transferred their dominance to the online world and the record industry is beginning to see positive impacts from the digitalisation of music sales. The overall implication is that those firms that dominated the old communications environment will dominate the NCE, along with a number of successful new media companies such as Google and Yahoo. However, the internet has also facilitated the growth of a new group of people and organisations that are rejecting old market-based business models and are using new technologies to build new communities based on different norms and values. This will now be discussed.

6.2 – New actors and the new ‘institutional ecology’ of the Networked Communications Environment

Interactive internet-based technologies have facilitated new forms of social and political networking and participation between ‘active users’ (see introduction) on the web. Internet industry analysts refer to the rise of ‘Web 2.0’, a phrase coined in 2004 to describe the ‘new generation of internet applications and businesses that were emerging to form the “participatory web”’ (Madden and Fox, 2006). Many believe that this represents the formation of new social structures and modes of human interaction that have the potential to replace market-based structures and norms of the pre-internet era.

For example, Benkler (2006:7) argues that the internet has given rise to a new ‘institutional ecology of the digital environment’, a ‘flourishing non-market sector of information, knowledge and cultural production’ that rivals the institutions of the dominant market-based economy. One example of this new institutional ecology in action is Wikipedia, an online encyclopaedia collaboratively and voluntarily produced by geographically remote internet users. Wikipedia is the most frequently accessed digital encyclopaedia and the 12th most popular internet site on the web¹⁴ (Alexa.com Traffic rankings 22/01/07). Examples abound of the ways in which ‘citizen journalists’ have influenced the actions of politicians both directly and indirectly (see for example Benkler, 2006), and many mainstream news organisations now have both paid staff responsible for blogging and also accept submissions from the public in the form of blogs, comments and photographs.

The impact and implications of the new institutional ecology of the NCE will be discussed further throughout the *Freedom of Expression* project. However, it is important to consider here whether the new community of interactive web users are driving changes towards the creation of more democratic and inclusive communication structures and business models. The rise of web 2.0 is undoubtedly an important phenomenon, but the jury is still out as to whether new community-based norms of the web will become dominant and replace market-based norms. This is a question that advocates of the new ecology are urging regulators to consider when forming policies that will affect the nature of the NCE, with IPR and net neutrality as notable examples (Benkler, 2006; Lessig, 2001).

As noted above, the old incumbents in the telecoms and media sectors appear to be successfully adapting to the NCE, learning how to implement proprietary, market-based

¹⁴ MSN is the second most popular site, but its digital encyclopaedia Encarta makes up less than 1% of site traffic (Alexa.com, accessed 22/01/07).

models in the new environment to make money and maintain their dominance. This is also apparent in the arena of web 2.0, for example with many blogs dependent on the mainstream media for gaining publicity and the comments of users on sites such as BBC news subject to control and editing by mainstream media staff (Chaudhry, 2006). The success of new business models supported by innovative regulatory mechanisms such as the Creative Commons licence (of which over 150 million have been issued in the last four years - Lessig, 15/12/06), represent a degree of resistance against traditional market-based models and regulation perceived to protect the interests of big business. However, some successful community networking sites that had the potential to foster a new institutional ecology on the internet are being taken over by market-based media companies, such as the recent acquisition of MySpace by News Corp. Old and new companies who have successfully adapted market-based business models to the new and changing nature of the NCE are amongst the most powerful actors in the global economy. Most notable here is Google whose personalised advertising model has enjoyed huge success. This is giving it not only economic power, but also power over the content accessed by internet users dependent on its search facility to find information. Thus, whilst a new 'institutional ecology' has grown on the internet and its users have influenced the shape and workings of the NCE, it remains to be seen whether its non-proprietary and democratic norms will have continuing influence or whether they will be eroded by the norms of the market economy as actors within it adapt to the new environment. As emphasised throughout this paper, the outcome of this struggle will depend on the interplay between politics, regulation, markets and technological change.

7) Conclusion

This paper has provided insight into the nature of the technological, political and economic drivers of change in the networked communications environment, exploring how the interplay between factors in these broad categories has shaped the nature of the environment today. The NCE is continuing to evolve as new technologies emerge and stakeholders working within the three main drivers of change struggle to understand and adapt to the new environment. In doing so, they are in turn influencing the direction of change and the shape of the future NCE.

Goldsmith and Wu (2006) point out that, throughout history, it has taken time for regulatory bodies and business models to adapt to changes in technology. We may therefore currently be experiencing a period of flux as transition to a new equilibrium in the communications environment occurs. Indeed, the discussions in this paper have suggested that actors from the old communications environment are beginning to achieve success in transferring their models and institutions into the NCE. At the same time, technological change is likely to continue to occur and, accompanied by changing political, economic and social norms, may result in a continuously evolving NCE. Either way, the implication is that those wishing to have an impact in fostering change, such as an improved environment for freedom of expression, need to act now.

The layer model this paper proposes, accompanied by an understanding of the interrelationships between drivers of change, not only helps to highlight trends and dynamics in the NCE, but also helps identify areas where those wishing to foster change should intervene. This paper has provided a basis for the workshops and research papers of the *Freedom of Expression Project* to explore these potential areas of intervention in more detail, as well as a platform from which the challenges and opportunities that the evolving NCE presents for the right to freedom of expression can be further explored.

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