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ARTICLE

# Globalization, nationality and commodification: the politics of the social construction of the internet

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### Abstract

Theories of the social construction of technology help to identify ways in which social forces can influence the development of communication media such as the internet, but often fail to pay sufficient attention to the ways that social structures constrain the agency of those who are most central to the social construction processes. This article examines some decisions concerning the domain name system of the internet and finds that such structural concerns add a needed dimension and can illuminate the power relations that help to shape the role of the internet in the tension between national and global structures of communications.

### Key words

capitalism • commercialization • domain name system • internet  
• social construction of technology • Tuvalu

### INTRODUCTION

Those observing the social implications of the internet have no shortage of possible starting points to choose as the basis for their discussions. However, two tendencies stand out as being so important that they need to be taken

into account by any attempt at theorizing the relationship between the internet and society. First and most obviously, the internet is very much a global medium, supporting the flow of information and images around the world without regard for national borders, thereby diminishing the relevance of nationality to communication. Second, the internet is becoming increasingly commercialized, as seen in ubiquitous online advertising and other visual reminders of the profits being made in cyberspace, that were once (happily) entirely absent from users' experience of the network.

Studies of the internet that emphasize the former of these two tendencies often conceive of this process as an unavoidable result of some inherent characteristic of the technology (Castells, 1998; Deibert, 1996; Poster, 1999). Thinking along these lines leads such inquiries to rely (at least implicitly) on technological determinist assumptions about the relationship between technology and society. The reasons for rejecting this approach are by now well known, although they do not seem to have put an end to claims that technologies such as the internet necessarily have particular social impacts -\* in this case, the irrelevance of the nation-state in a globalized world.

Studies which emphasize the latter tendency run the opposite risk, of relying on theoretical assumptions that sometimes are called 'instrumentalist', and seeing technology as a instrument which can be used by the powerful to exercise their power over others (Barney, 2001; Fortier, 2001; Gutstein, 1999; Lovink, 2003; Schiller, 1999). The implications of the technology are presumed to depend on the way that they are used rather than on an inherent character of the technology; the technology itself is less important to examine.

There is *an* obvious tension between these two sets of assumptions and neither is much good at explaining how the internet can possess both of these capacities. A third approach, which can be loosely termed the 'social shaping of technology' perspective, has gained some popularity recently, as it seems to be able to avoid both pitfalls. According to this approach, values are embedded in a technology through a social process of the interaction of different groups of relevant actors who are involved in the process of design." One excellent illustration of the need for a theory that incorporates such processes is the ongoing debate over internet governance. Recent UN summits have attracted attention to the kinds of decisions that must be made about managing the internet, demonstrating that the internet is neither imposing a particular 'network' structure on the world (Castells, 1996, 1998), nor is it merely a tool of the powerful, but instead is an artifact over which social actors contest to influence the way that the technology is designed, deployed and experienced by users.

However, more than an identification of relevant social groups that influence the outcome of technological developments is needed. In this approach, the relevant actors making decisions about social shaping are seen too often simply

as agents with different interests who act in different ways. Often, what is not recognized is that the decisions about the development of technology are made by agents with different locations in structures of social power, and the different locations create differences in the extent to which different agents are able to participate successfully in the process of social shaping.

This article attempts to illustrate the need for attention to the structural constraints on the process of the social shaping of technology by examining one set of decisions concerning one aspect of the technology's design. Several important decisions made by various actors responsible for the management of the internet's domain name system (DNS) lead to the sale on a global market of rights to use internet addresses that were designed for certain national communities. The reasons for this sale will be explored in order to illustrate the importance of situating seemingly technical decisions within the context of the unequal economic relations that characterize global capitalism.

The DNS and its relationship to the question of nationality and globalized communication will be explained in detail, after a few necessary clarifications about the theory of social construction of technology and its relationship to the internet.

## SOCIAL CONSTRUCTION AND INTERNET GOVERNANCE

The basic idea behind the social shaping of technology approach is that there are moments in the development of a technology at which different social agents make decisions of a more or less deliberate nature that lead the technologies to have some particular capacities and lack others. Such decisions embed certain kinds of values in the technological system, producing devices that are more useful as a means to some ends than to others. Once the decisions are made, the technology appears in a form in which it is more likely to be used for certain kinds of purposes rather than for others. In this form, the implications for society appear to be an effect of the technology itself, rather than of the decisions which have produced it. Although these decisions may be made in the original invention process, often that process is not a single event, but an ongoing process of continual improvement (or at least redesign). This certainly seems to be the case with the internet, which does not seem to be subject to what Pinch and Bijker (1984) call 'closure' or 'stabilization' — that is, the emergence of an arrangement of the technical system that is adopted and accepted widely enough so as to be stable and not susceptible to further development. That these processes continue heightens the importance of the study of the social construction of technology in the case of the internet.

However, this set of assumptions leaves open the crucial question of why some people have input into the decisions rather than others. As Klein and Kleinman (2002) and others (e.g. Mansell, 2004) point out, these kinds of

political questions have not been emphasized enough in theories of social shaping of technology. They make possible the investigation of the politics of social construction and must be investigated if we are to understand the way in which societies and their technologies mutually interact, as opposed to merely understanding how different social agents influence technological development.

As Russell argues, a problem with the original formulation of the theory was that it ignored 'the importance of situating policy processes and interactions between groups in a structured and historical social context' (1986: 341). Even some of the work associated closely with that theory, such as that of Hughes (1984) and which attends to the social context of technological developments, only deals with that context as a social system, not as a structure of power relations. Only once the politics of the process are understood can we see how technologies play a role inside the power relations in society, instead of merely seeing technologies as tools built by the powerful to assist them in the exercise of their power. Such investigation must begin by recognizing that different technologies can be designed or configured differently, implying that some technologies are likely to be engineered to support uses that reproduce social structures, while others are likely to be transformative in their impact. Technological determinism is not wrong about this: different technologies do have different implications. In the case of the internet, the network protocols on which it runs were designed to maximize flexibility and minimize the need for centralized operation, making it more versatile than any other communication technologies (Flanigan et al., 2000; Lessig, 1999). The technical design of the internet empowers users by diminishing differences of power between consumers and producers of information, lending plausibility to the instrumentalist view of technology that implications depend on the actions of users rather than any technical quality of the system. This flexibility designed into the very structure of the internet helps to explain why both deterministic and instrumentalist approaches to the internet continue to have influence.

However, despite the openness and flexibility of the structure of the internet, there is still a politics somewhere in that structure, which is likely to shape the experience of communicating and accessing information through cyberspace. The task of understanding that politics is made much more difficult by the diversity of uses of the internet and the consequent difficulty in describing trends or patterns in internet use. Nonetheless, that use is not completely individualized or unstructured and the different opportunities that the network makes available to users are in many ways the result of structures designed into that system at a deep level.

Unlike television, where the tastes of the majority, government regulators and monopolistic broadcasters play a large role in dictating what content is

made available to others, the options open to internet users do not seem to be affected by the choices of others. However, there are some ways in which influential decision-makers do play a role in shaping the experience of users generally. While it was common in its early days to argue that the internet is completely non-hierarchical and allows all to control their own use of it equally, it has become clear that there are many forms of power in cyberspace that matter enough to struggle over (Winseck, 2002); this is in part why the United Nations (UN) initiated a pair of World Summits on the Information Society (WSIS). The transnational nature of the internet makes the process of influencing content more difficult, but the existence of global decision-makers for the internet is coming into view more widely now: If we are to think clearly and critically about the social implications of the internet, it is necessary to identify these decision-makers, the source of their power over global communications flows, the nature of their relationship to older structures of power and to determine just how they contribute to the ongoing social shaping of such a decentralized technological system. Developing such an understanding can contribute to a theoretical understanding of the relationships between technological development and the structure of social power more generally.

One institution that is often identified as central to the ongoing development of the internet is the Internet Corporation for Assigned Names and Numbers (ICANN), which administers the DNS for the internet (allowing users to locate information on computers through labels such as 'icann.org') as well as performing several other important administrative functions. The subject of many politically charged disagreements between the USA and other states at the WSIS and elsewhere, ICANN's decisions affect the shape of internet communications in subtle but important ways (Mueller, 2002). Perhaps the most controversial recent decision concerns the proposed establishment of a '.xxx' domain to identify pornographic content. ICANN suddenly agreed to this in 2005, reversing earlier statements, only to reverse its decision again after strong objections were raised by the US Department of Commerce and other governments (McCullagh, 2005; Wearden, 2005). Later ICANN announced that it had abandoned the proposal (Weardon, 2005). Given the intended purpose of this domain and the recent unilateralist shift in US foreign policy, it is unsurprising that such decisions became the focus for expression of dissent over the current regime of management of the DNS. The existence of such controversies show that ICANN's role is not limited to technical management but also involves issues of national values and the social control of technology.

While in the case of '.xxx' the most powerful actor concerned, the US government, was able to assure that its values shaped the outcome of the decision-making process, this cannot be assumed always to be the case.

Particularly, it is instructive to consider the results of the management of internet domains that were associated specifically with national communities, such as '.uk' or '.ca'. The domain assigned to the Pacific island state of Tuvalu, '.tv', is especially useful in illustrating important but frequently unrecognized aspects of the decision-making processes that shape the internet.

## DOMAIN NAMES AND COUNTRY CODES

For the internet to route information effectively across network connections, each computer must be identified with a unique number, known as a network address. Since the large number of computers connected requires numbers longer than any human would find useful, a scheme was devised that would match the numeric addresses of network computers to alphabetic names, which would be more useful as identifiers for human users. To distribute the labour involved in managing the processes of assigning names, the system of alphabetic names was divided into domains and organized hierarchically. The top of the hierarchy contains approximately 260 suffixes, such as '.com' or '.uk', each of which indicate a top-level domain. Names of particular computers within that domain appear in front of the suffix (for a fuller explanation of DNS, see Mueller, 2002).

To ensure that data traffic is sent to the appropriate computer, domain names need to be allocated by a registrar that maintains a database of domain names, ensures that domain names within each domain are unique and matches them to network addresses. Each domain then can be administered separately, allowing different authorities to allocate host names with their domain. Some domains are allocated to national units, some are designed for specific purposes and others, the generic top-level domains, have no distinct purpose.

While the hierarchical division of the DNS allows the work of registering names to be distributed, a central list of the different databases for the different domains around the world is clearly necessary. The question of who controls this list has consumed much debate, as the institution charged with this responsibility is able to create new top-level domains, recognize the registrars of different domains, set rules for dispute resolution and a variety of other tasks that affect how the DNS works. That institution is ICANN, which currently operates on the basis of a mandate from the US Department of Commerce. This is an historic legacy of the fact that the internet was created in the USA; the maintenance of the DNS was originally done by Jon Postel who played an important role in the origin of the system (Abbate, 1999). As the network grew and the number of registrations overwhelmed the capacities of a single individual, a more formal institution was set up (the Internet Assigned Numbers Authority; IANA) and later the US government initiated a process which created ICANN and brought that work under the

terms of a contract between itself and the Department of Commerce (Goldsmith and Wu, 2006).

In its early years, when the internet was a relatively small network, and until the late 1990s, there were only seven top-level domains: '.com', '.org', '.net', '.int', '.mil', '.gov' and '.edu'. Each originally had a specific purpose and the last four are still reserved for particular types of institutions. The first three, the truly 'generic' top-level domains, were intended to be used for commercial entities, non-commercial organizations and internal network purposes respectively, but as the network administrators in California who managed the system were not in a position to enforce the rules, the distinction was abandoned eventually. When the computers outside the USA were connected to the internet, network administrators in other countries suggested that they should not be using domains that are administered in the USA; the first new domain set up for non-American host computers was '.uk' (Wass, 2003).

The practice of using two-letter country codes for domains that operated in other countries soon became standard, and at the time of writing there are more than 252 of them (see IANA, nd). Country codes are designed to signify the national origins of packets of information in cyberspace, just as flags are used to denote the national origins of physical goods in shipping lanes. They denote not just sovereign nation-states but also overseas territories, such as the British and US Virgin Islands, Antarctica and other places. In order to avoid having to decide what deserves its own national identifier, the original managers of the system relied on the list maintained by the UN known as ISO-3166 (Weinberg, 2002; Yu, 2003).

However, like other top-level domains, country codes have a function that is not technically necessary: the purpose of these codes is not to identify network locations on the internet to other computers, as this is done by numeric addresses. Country codes, as with the rest of the domain system, are designed to signify these numeric addresses to people. They are useful not because computers need them, but because they have meanings which make them easier for humans to remember; in this sense they are technically redundant because their value is *semiotic*, not technical. This non-technical, semiotic function of the DNS can be demonstrated by distinguishing the DNS from the system of numeric addresses. Domain names are not actually necessary for computers to be connected to the internet. Some computers are connected to the internet in order to serve technical functions such as supplying data to other computers rather than providing information to people, and such computers need only a numeric address. Therefore, a computer cannot be 'removed' from the internet merely by revoking its domain name, although it would be likely to ensure that most internet users will not be able to access information stored there. If people are to have

access to the information stored on a networked computer, those computers need to be named rather than numbered, so that people can recall the signifiers used to denote them. We understand the meaning of identifiers such as 'microsoft.com' and 'indymedia.org', much more than we do numeric addresses; presumably these identifiers carry some associations beyond the numeric address to which they are connected. This human intellectual process of assigning meaning to signs is central to the purpose of the DNS, so domain names must be treated much more like linguistic signs than the technical elements in the system of numeric addresses on the internet.

While the country codes "were deliberately chosen in a manner that avoided political conflicts over the choice of which entities to recognize as countries, it still required each domain to be managed by a recognized authority. ICANN now assigns this authority and the potential for conflicts over how this is done persists. Early documents outlining the basis for the decision about who should be recognized as a registrar stated that "[C]oncerns about "rights" and "ownership" of domains are inappropriate. It is appropriate to be concerned about "responsibilities" and "service" to the community' (Postel, 1994). Governments were not automatically recognized as having a right to administer their domain names, but they were 'taken very seriously', or given serious consideration in selecting registrars. The intention was that a national registrar should be thought of not only as a 'trustee for all the nation', but also as having a responsibility *to* 'the global internet community' for ensuring the stable and effective functioning of an important part of the internet (Postel, 1994; see also Yu, 2003). In this sense, different and potentially conflicting values — responsibilities to both national and global communities — were designed into the structure of the internet. The original architects of the internet were attempting to incorporate some of the needs of national structures of communication that were already present, without abandoning a notion of a transnational community of computer users. ICANN has inherited the system that is based on the imperfect compromise between these values.

The point here is that choices were made; there was no technical reason why the internet needed to have country codes at all, or to have generic, non-national domains either. A decision was made to use both, so that information could be identified with either a national suffix or a non-national one, and both kinds of signifier would work in the system. However, this decision implied more than just a variety of types of domain: country codes and the other, non-national domains were both created at the same level — the top — of the hierarchy of domains. This could have been decided differently. One option would have been to have all country codes subordinated under a single, internationalized, generic, top-level domain, such as '.int'. In this case, those wishing to register a computer network without a national identifier could choose a name in the '.com', '.net' or '.org' domains,



while other computer networks still could be identified nationally through country code domains within an international domain at the second level of the domain, such as '.us.int', '.uk.int', '.ca.int\*', etc. Conversely, country codes could have been made the top level, in which case, all '.com', '.org' and '.net' domains would operate as subsets of a country code domain, such as '.com.us', '.org.ca', or '.net.uk'. That neither type of top-level domain was prioritized suggests that the development of country codes was not seen as inconsistent with global top-level domains. Both values of national identification and global communication flows were considered equally important and the internet 'was engineered to be able to support both kinds of signification. ICANN continues to operate on this basis, having inherited the structure built by earlier individuals and institutions on these different values. It operates the main databases required for the DNS to work, to recognize the legitimate authorities for each domain and decides when new top-level domains will be created. Any attempt to identify an actor with power to direct the ongoing process of social construction of the internet at least should include ICANN.<sup>4</sup>

At about the same time as ICANN was announcing its intention to create the '\xxx' domain, negotiations leading up to the second WSIS meeting became the site for airing demands for change to control over ICANN. States such as Brazil and China as well as the European Union (EU), which opposed the idea of US control of ICANN, suggested that an international body such as the International Telecommunications Union should be assigned the task instead, while the USA continued to assert its intention to sustain the existing arrangement (Mueller, 2005; White, 2005). These disputes represent an instance in which the structure of social power comes into conflict with the way that an important technological system is configured. However, to presume that governments or other institutions are able to shape the system to suit their interests does not always explain the result; often attempts to shape technological systems are limited by the context in which they are made. In this case, the context of the distribution of material power in a global capitalist economy must be taken into account.

## NATIONAL REGULATION OF COMMUNICATION

However the internet is run, there must be some authority capable of ensuring that domain names and numeric addresses are globally unique and that the data required to route information are freely available; that authority, of necessity, must be global. The debate over internet governance is not, strictly speaking, a conflict between those who prefer communications to be regulated nationally and those who advocate global management. So far, the debate is only about how such a regulating authority is made accountable: whether it be to one nation-state or to some other entity.

US control of ICANN is problematic in that national domain name registrars are all, in important ways, dependent on and subject to the authority of ICANN which, as previously mentioned, operates under the authority of the US Department of Commerce. For example, ICANN is able to revoke the management authority of other country codes, as has been done with Australia and the Pitcairn Islands (IANA, 2001; Steinberg and McDowell, 2003). If the registration authority for the '.us' domain were reassigned by someone over whom the US had no control, most likely the US government would express some dissatisfaction.

That the international scale of US power is taken for granted in so much of the world makes it much easier for the USA to ignore such arguments and continue to exercise control over the system that it created, even though it has now become global in scope. However, if the use of country codes as part of the DNS is to be of any value, then those country codes need to be managed by registrars that are national in some important sense of being responsible to the national community whose country code they manage.

Outside the USA, traditional media such as broadcast television and radio have long been considered important enough for governments to regulate - not merely in order to restrict the flow of information deemed subversive to governmental power, but as a way to protect cultural industries and promote national consciousness. Anderson (1983) argues that, in fact, the very existence of national communities derives, at least in part, from the original development of print industries in the early modern era. Regardless of how far in the past this pattern is traced, it is clear that many industrialized nations (and many others) have seen communications as an activity that ought to be regulated nationally. For example, most industrialized nations have run national public broadcasting companies until recently and private media industries often have been subject to a variety of non-market forms of regulation. In the case of Canada, restrictions are placed on the proportion of broadcast content that must be national in origin, as well as on the ownership of media industries, and government funding of media production is substantial, relative to the size of the industry. While it is occasionally argued that this unnecessary and unjustified (e.g. Collins, 1990), most accept that the economic and geographic relationship to the USA makes it unavoidable if a 'Canadian media industry' is to exist and carry any images of Canada to Canadians. Similarly, the '.ca' domain name space is regulated by the Canadian Internet Registration Authority (CIRA). Those wishing to register a domain name for an internet host with a distinct Canadian identifier affixed to the end must meet a set of conditions, one of which is Canadian citizenship or registration of a corporation in Canada (Canadian Internet Registration Authority, 2003). This does not imply any necessary Canadian character of the content of any '.ca' website, but it does identify computers registered with a

'ca' domain name as having some association with Canada. While not a necessary geographic association, such rules make it most likely that any email message one receives from a '.ca' address will come from a Canadian and that the information found on a '.ca' website is likely to have been made available by a Canadian. If nothing else, it implies some form of accountability, as the registered owner of the website or email server is then subject to Canadian law. It also implies informally some connection between the information conveyed and the nation of Canada.

Although three of the generic top-level internet domains, '.edu', '.gov' and '.mil', are reserved for use by US institutions, the USA is also allocated the country code of '.us' and imposes similar restrictions (Neustar Inc., 2005). As a result, that domain is used primarily by state and municipal governments within the USA. However, not all nations control the use of their country code: there are a number of examples of national governments "which, despite having formal control over their domain names, allow domain name registrations to be sold freely to anyone around the world. In most cases, it is unlikely that someone with no association with a national community would want such a domain name, but several countries have attempted to use their domain name as a source of revenue. This is made possible, semantically, by the fact that these two-letter codes appear as meaningful to others: that is, they have some semiotic value other than as signifiers of nationalities. For example, doctors might wish to register a domain name ending in '.md', which happens to be the internet country code for the Republic of Moldova (Gallup, 2003). This is also made possible, administratively, by ICANN's decision to continue to recognize national registrars who openly sell registrations for a country's domain. At the ICANN general meeting of May 1999, ICANN's Government Advisory Council meeting discussed a proposal that would have restricted the practice. Although the proposal was supported by several large industrialized nations, the representative for the Moldovan internet registry opposed this motion on behalf of small nations who stood to lose a source of revenue in the event of such a ban, and consequently was asked to remove himself from the discussions. When word of this reached other delegates at the ICANN meeting, opposition to the proposal from many small nations led it to be pushed off the agenda (Gallup, 2003; Government Advisory Council, 1999). The registrars that ICANN recognizes continue to be free to do as they wish with their country codes. Other examples of nations that have opted to open registration for internet names in their country's domain include '.fm' (Federation of Micronesia) and '.nu' (the Swedish word for 'now', representing the Pacific Island microstate of Niue; Steinberg and McDowell, 2003). The governments of these territories retain authority to do as they wish with the domain names, but several of these nations have contracted the marketing and retailing of domain names to

corporations located outside the countries. The contractual arrangement may benefit the nation financially, compensating for loss of control over the signifier that otherwise would connote the nation.

One might expect that the most profitable country code domain name to sell on a global market would be that of Tuvalu, which had the luck of being allocated the country code composed of what is probably the most common two-letter symbol in the world: TV. However, what makes the commercialization of the '.tv' domain more interesting is that Tuvalu is not just a small and little-known country; it is also very remote and very poor. It does not have any television broadcasting capacity of its own and until recently had very few telephone lines. It has no substantial natural resources and no nearby trading partners (CIA, nd). When the business of registering domain names began to grow, the Government of Tuvalu entered into a contractual arrangement with the .TV Corporation, set up for the purpose of marketing '.tv' registrations. The original deal was relatively lucrative, with a promise of \$50 million over 12 years, a substantial amount of income for a country with fewer than 11,000 inhabitants and a GDP of \$12 million, dependent on foreign aid for most of its government budget (Ward, 2000). Also, the original deal gave the Government of Tuvalu part ownership of the venture, with representation on the board of directors of the .TV Corporation.

However, in 2001, when the expected revenues from sale of the names did not materialize, the corporation was purchased by Verisign, the corporation which holds the contract to operate the registry for the '.com', '.net' and '.org' domains. Verisign paid Tuvalu \$3 million for the government's stake in the company, although it is still in a contractual arrangement with the Tuvaluan government, with decreased payments to Tuvalu. The original deal was signed in 1999, at the height of the dot com bubble, and Tuvalu was not alone in being disappointed about the revenues from internet-related businesses (Raskin, 2003).

Despite a substantial attempt at marketing, the attempt to have '.tv' enter global consciousness as a common ending for domain names related to television has not been a success. The '.tv' domain has not become as popular as was expected: '.tv' names are rarely seen in advertising or on links to websites and the attempt to identify '.tv'<sup>1</sup> as a domain for information about television mostly has failed. US networks such as CNN and ABC have registered the corresponding '.tv' domain names, but attempts to use these domain names redirect browsers to the '.com' websites for those corporations. There are some corporate entities that use '.tv' domains, such as MTV Europe (mtv.tv) and Time Warner's TNT network (tnt.tv) and some other domain names were sold at very high prices, but many were not: 'business.tv' and 'news.tv' are still for sale on the registration website, listed at \$1 million (.TV Corporation, nd).

This failure probably has more to do with the status of '.com' than it does with the particular character of '.tv'. The '.com' domain still remains nearly synonymous with the internet, as is indicated by the use of the term 'dot com bubble' for the wave of speculative investments in the internet industry in the late 1990s. This might be an effect (or a cause) of a close association in popular consciousness between the business world and new media, but it seems reasonable to expect that some domain would dominate, as the overwhelming popularity of a single domain makes it easier for users to find domain names with which they are not familiar. While not as popular as '.corn', other domains are still in use, helping people to remember how to find information on the internet. Names in many domains other than '.tv' or '.com', such as '.net', '.org' and '.info', are successfully sold as commodities on a global market and have the same semiotic function as corporate brands, that of capturing attention through the creation of associations between corporations and visual symbols (Klein, 2000).

Tuvalu did benefit financially, receiving much more revenue than from any of its previous similar ventures, such as the sale of its coins and stamps, or leasing its international telephone country code for toll calls (CIA, nd). A school was built, roads were paved, the airport was expanded and electrical grids were installed (Gaither, 2001). However, not all of Tuvalu's problems were solved and, of course, the overall impact on the economic conditions for average Tuvaluans in the country will depend on internal political considerations that determine how the funds are redistributed inside Tuvalu. For the purposes of this argument, we only need note that what Tuvalu (and other nations) have given up for such benefits is the ability to attach their nation's identity to their two-letter country code.

While only intended as a source of much-needed revenue, the practice of commodifying domain name registration has the important effect of disassociating the country codes and national communities they were originally intended to represent. The codes no longer have the same meaning; other concepts are represented by the two-letter symbols. The meaning of the symbol '.tv' can no longer be tied to the nation of Tuvalu, leaving that country unable to identify itself in the virtual global environment of cyberspace.<sup>5</sup> In this case, the structure of the internet's DNS supports a globalized, rather than nationally organized, flow of information. That Tuvalu actually loses this ability can be seen in the way in which websites which sell registrations of '.tv' domain names can do so entirely without mentioning Tuvalu; one can buy a '.tv' domain name without ever being aware that the domain name only exists because of a country with a particular name. In other words, rights to use a resource that belongs to Tuvalu are sold to people who may never be aware of the existence of the country. This may appear to be of interest only to theorists, but there is one important aspect of Tuvalu's

position in the world that, arguably, gives it some importance outside the country. Tuvalu is most likely to be one of the first island states to be submerged as global warming causes ocean levels to rise (Simms, 2001). National control of its domain name surely would not be enough to prevent this from happening, but decreasing the probability of people being aware of the existence of the country makes its problems - are quickly becoming everyone's problems — even less likely to be taken seriously.

That the commodification of these domains requires country codes to have some pre-existing meanings apart from their national origin, does not necessarily imply that the difference between the domains that are commodified and those that remain national in meaning is entirely a product of these meanings. There are two-letter codes which have been marketed globally which do not have a very obvious connection to other meanings, such as '.ws' (Western Samoa, for 'website'), '.pw' (Palau, 'personal website') or '.to' (belonging to the Pacific Island state of Tonga). Even if these domains remain obscure to most users, a small number of registrations is likely to be more economically beneficial for the countries that control them than the practice of ensuring that they are used nationally.

Other country codes are composed of two-letter symbols which also have some other meaning and therefore might have value as commodities, but are not sold. Norway's authorities have resisted offers for domains ending with '.bv' (a domain attached to the remote, uninhabited Norwegian territory of Bouvet Island) to Dutch companies interested in using the Dutch acronym, equivalent to the English 'Ltd' (Taggart, 2001). This makes an excellent contrast to the Tuvaluan case; the obviously relevant difference here is that Norway, a large industrialized and relatively wealthy nation, can forgo the potential revenue from such selling such registrations much more easily than any of the small, under-industrialized nations that do sell their country code.

#### GLOBAL CAPITALISM AND NATIONAL IDENTITY OF DOMAIN NAMES

That country codes end up as commodities for sale is not particularly surprising; it is one small part of the widely recognized process of commercialization of the internet. What was seen originally as a non-commercial, non-hierarchical, open and democratic public space increasingly is assuming the form of a tool for consumption and advertising. However, the commodification of domain names illustrates some important implications of this process. The meaning of these two-letter country codes is altered from the denotation originally intended — the national origins of information - to whatever meanings have financial value for the global internet industry. What is commodified in this particular instance is not the information that is transmitted through the internet, but the information about that information, about the national origins of the information received. If the commodification

of country codes were to become universal, then information flow again would resemble the very early days of the internet before country codes were introduced, when there was no geographic or legal connection to any point of origin of information flow. Country code domain names were intended originally to associate information with nationalities, but the process of commodification changes the meaning of the identifier so that the origins are obscured. There is much information whose point of origin is irrelevant, but in some cases the national origin can matter; otherwise, the generic top-level domains would not have been considered insufficient.

Whether or not it is important to be able to make use of the origins of the information in our interpretation of it, this shift in meaning illustrates an important fact about the social shaping of technology. While the process of constructing technology is a human activity and not a force of nature, the result of the social construction is not always the creation of a technological system that serves the interests intended by its creators. The original intention behind the decision to use the ISO list to allocate country code domains was to provide each country with an equal capacity to manage its own portion of cyberspace. However, the result is an inequality in which some nations are able to do so and others sell the rights to use their cyberspatial resources on a global market.

The commodification of domain names is taking place in smaller, less developed countries such as Tuvalu and Tonga, while wealthier industrialized countries such as Canada, Norway and the USA continue to restrict use of their country code domains for national purposes. This cannot be explained by reference to the values embedded in the internet's technical or administrative structure through the social shaping process without taking into account the power relations between the actors who influence that shaping process. The intentions of the individuals who designed the DNS, and the institutions that continue to manage it, do not explain fully the difference in the extent to which the DNS supports or undermines national identities. That difference can be explained only as a result of the international inequality of wealth that characterizes the global capitalist economy. In an important sense, given Tuvalu's location in the global economy, it simply could not refuse a multi-million dollar deal for the use of its domain name, whereas other countries could. Global inequality of wealth must be seen as an important structural constraint on the agency institutions, policymakers and others involved in the social shaping of the global structure of the internet's DNS. As the foundation of the much-discussed digital divide, that structure forms the context in which internet technology becomes part of the experience of users everywhere, and constrains the agency of those whose decisions shape the experiences of internet users. This inequality mirrors the inequality in the economic world, despite the virtual equality designed into the system. Such a technically equal arrangement cannot manifest itself in an

unequal world, as the potentials of the technical system that are distributed formally cannot be realised equally without some material resources. Tuvalu is too poor to make use of the '.tv' domain for its own national purposes, and so having the same 'amount' of cyberspace as large industrial economies does not imply an effective cyberspatial equality.

The fate of the '.tv' domain serves as an instructive example of the politics behind the process of social construction of a technology. That process is not one in which powerful agents are able to construct a system so as to enable or prevent different uses as they wish. If it were, it is unlikely that we would ever be able to explain the role that technologies play in processes of social change. Rather, the activity of social construction is one that is performed by agents within structures that constrain their agency, and thus the resulting technological system is one that might function in ways very different from what is intended.

In the case of '.tv', even though the engineers who administered the system created top-level domains to reflect national identities in parallel with the non-national domains, some of these domains lose their national character as a result of sales on a global market. The arrangement of economic interests in the global economy overrode the intentions of those involved in socially constructing the DNS. While the intention was to provide opportunities to support both national and global structures of communication, the capacity for the former is distributed very unevenly in the material world.

Although it is only one minor example of the dynamics involved in the social implications of the internet, the commodification of country code top-level domains manifests important aspects of the relationship between the internet and national structures of communication. While it appears to undermine the organization of communication around national identities and communities in the case of Tuvalu, the internet's DNS does this only as a result of the global economic structure within which it is administered and used, and this tendency is one that applies more to some actors than others, given the inequality of that structure.

The effects of social structures such as the global market and the international inequality of wealth, not just the intention of the agents and agencies that attempt to shape the process of the network's development, must be examined to explain the commercialization of the internet. Such explanation would help to explain the ongoing commercialization of cyberspace, neither as a necessary result of its inherent structure, nor the result of the outcome of debates over the management of the network, but as the result of the fact that that shaping takes place as a result of decisions made within a broader set of structured relations. Other issues, such as conflicts between demands for privacy and the interests of security as expressed in increased surveillance of personal use of the internet, or between intellectual property rights and free speech, might be best understood using this



approach. By keeping in mind the complexities of the relationships between technology developers, consumers, governments and content providers and the different locations of each of these agents within the context of a global capitalist economic system, a more adequate theory of the social shaping of technological development is possible. More broadly, this insight can shed light on the bigger question that has come to be central to the debate over the internet: whether or not it tends to reproduce or transform structures of social power. From this perspective, it becomes clear that it can do either, or both. However, which tendency dominates in the case of any particular issue will depend on how the system is configured, and that configuration will be the result of the work of actors situated within those very structures of power. Since the relevant structures here - including not only the global capitalist economy, patriarchy, the division of the world into national units and others - are varied, complex and contradictory, attention must be directed toward the particular details of how social forces are brought to bear on any particular aspect of the internet's operation, before judgement can be made about the implications of the technology on that structure.

#### Notes

- 1 Valuable critiques of these arguments are found in Feenberg (1990), Mackenzie and Wajcman (1999), Williams (1974) and Winner (1977). While most social scientists no longer rely on technological determinism in the form articulated by, for example, McLuhan (1962), much popular discussion still treats the newness of the technologies in a deterministic fashion, as evidenced by the kind of attention given to each new web application and its potentially revolutionary uses (most recently, podcasts and Hogging), as if the latest trend is the one that will finally transform the world (see, for example, Armstrong and Moulitzas Ziiniga, 2006).
- 2 The term 'social construction of technology' is used also to describe this approach, but this term is associated with the particular theoretical framework of Pinch and Bijker (1989). This article uses a more general approach, which I believe to be more widely accepted and often subsumed under the term 'social shaping of technology' (e.g. Mackenzie and Wajcman, 1999), but which can be understood to include the work of others who do not use that term to describe their work, such as Feenberg (1990), Flanigan et al. (2000) and Lessig (1999). What follows is, then, not a critique of the specific theory referred to as 'social construction of technology\*', but an attempt to illustrate some principles which might be helpful in thinking about the process by which people construct, shape, configure or develop technological systems and, in particular, how this has happened with the internet.
- 3 The WSIS, held in two phases in 2003 and 2005, was the most important international forum for the discussion of issues collected under the term 'internet governance'. For a discussion of the debates surrounding that summit, see Goldsmith and Wu (2006), Internet Governance Project (2005) and Working Group on Internet Governance (2005). The social construction of technology approach has been applied to new information technologies by a number of scholars, including Mansell (2004), Spitz and Hunter (2005) and many of the authors whose work is collected by Lievrouw and Livingston (2002).

ICANN's mandate also includes technical functions such as the allocation of numeric addresses and the management of root servers which store information linking domain names and addresses (see Mueller, 2002). Another important function of relevance to discussions of globalized flows of communication is the attempt to create a DNS that will recognize non-Latin characters; this is of much less importance to the US supervisors of ICANN than to many in other countries such as China, which has opted to work on this outside the framework of ICANN (see Espinet, 2006). It should be made clear that the disadvantage to Tuvalu is not in the ability to make use of the internet to communicate with the rest of the world. That ability may be constrained by its economic situation, but even without a domain name, the structure of the DNS itself does not restrict communication with Tuvalu. What is lost is the ability to attach a signifier to websites, email addresses and other internet applications that identifies the origins of information as Tuvaluan,

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