

Improving Internet Usability – A Framework For Domain Name Policy Evaluation

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

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Dated Saturday, 25 October 2008

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Glossary

.au

The Internet country code top-level domain for Australia.

2LD

2nd Level Domain name (for example com.au, net.au, org.au, gov.au).

3LD

3rd Level Domain name (for example auda.org.au, afl.com.au, rmit.edu.au).

AOEMA

Asia Oceania Electronic Marketplace Association.

APEC

Asia Pacific Economic Co-operation established in 1989 in response to the growing interdependence among Asia-Pacific economies. Beginning as an informal dialogue group, APEC has since become the primary regional vehicle for promoting open trade and practical economic cooperation. APEC has 21 member economies in the Asia-Pacific region.

APNIC

Asia Pacific Network Information Centre. Their primary activity is the allocation and registration of IP addresses (numeric addresses) and management of the corresponding DNS name space. They do not register conventional DNS names.

ARIN

American Research for Internet Numbers. A non-profit registry responsible for the administration and registration of Internet Protocol (IP) numbers in North and South America, South Africa, the Caribbean, and all other regions managed by Network Solutions Inc. Their primary activity is the allocation and registration of IP addresses (numeric addresses) and management of the corresponding DNS name space. They do not register conventional DNS names.

ARPANET

Advanced Research Projects Agency Network (ARPANET) was the first operational wide area packet switching network and predecessor to the Internet. ARPANET was developed by the United States Department of Defense. The global development of packet switching utilised concepts developed independently, such as the UK's National Physical Laboratory demonstration.

auDA

.au Domain Administration Ltd (auDA) is the policy authority and industry self-regulatory body for the .au domain space.

CENTR

The Council of European National Top-Level Domain Registries (CENTR) is an association of Internet country code top-level domain registries. Full CENTR membership is open to organisations, corporate bodies or individuals that operate a country code top level domain registry.

ccTLD

Country code top-level domain (for example .au, .uk, .de). Also referred to as a ‘national TLD’.

Country code

A two-character abbreviation for a country according to the standards set by ISO 3166. This alpha code is used as a top-level domain identifier to assist root servers in finding a specific computer address.

DNS

Domain Name System. The DNS is a general purpose distributed, replicated, data query service. The principal use is the lookup of host IP addresses based on host names. The current style of Internet host names (i.e. domain names) offer a means of mapping an easy-to-remember name to an Internet Protocol (IP) number. The Internet Assigned Numbers Authority (IANA) administers the DNS.

DNSSEC

The Domain Name System Security Extensions (DNSSEC) specify technical requirements for securing information provided by the Domain Name System.

Domain name

A unique alphanumeric designation (for example auda.org.au, microsoft.com, triplej.net.au, denic.de, nominet.org.uk, etc) that facilitates reference to the sets of numbers which actually locate a particular computer on the Internet.

gTLD

Generic Top-Level Domain. An internationally-allocated portion of the name space (for example .com., .net, .org, etc). Also referred to as a global TLD.

Host name

The name given to a networked device, located immediately to the left of the dot in an Internet address. For example: **hostname**.blah.com

IAHC

International Ad Hoc Committee. The technical body (dissolved on 1 May, 1997) which oversaw the development of the Internet suite of protocols.

IANA

Internet Assigned Numbers Authority. IANA is a United States Government funded authority that assigns and distributes international domain names, and IP numbers or Internet addresses, and oversees the Internet software protocols of the officially-sanctioned root servers.

ICANN

The Internet Corporation for Assigned Names and Numbers is a non-profit corporation formed to assume responsibility for the IP address space allocation, protocol parameter assignment, domain name system management, and root server system management functions now performed by IANA and other entities under United States Government contract.

IETF

The Internet Engineering Task Force is a large and open international community of network designers, operators, vendors and researchers concerned with the evolution of Internet architecture and the smooth operation of the Internet. It is open to any interested individual.

INTA

International Trademark Association. Based in New York, United States and has a worldwide membership.

Internet

International network of networks – the world’s largest network of interconnected computers used by individuals, organisations, and businesses for the exchange of information, goods and services. The Internet came into being between the late 1970s and early 1980s with the development and adoption of the TCP/IP networking protocol, which allowed ARPANET to join other networks.

Internet address

See IP address.

IP

Internet Protocol, first defined in RFC 791, is the network layer for the TCP/IP Protocol Suite. It is a connectionless, best-effort packet switching protocol.

IP address

Every machine on the Internet has a unique numerical assignment, which allows computers and hosts on the network to locate it. An IP Version 4 address consists of a dotted octet, and four sets of numbers separated by dots (for example 131.170.1.1). Whereas, an IP Version 6 address uses eight groups of four hexadecimal digits (for example 2001:503:a83e:0:0:0:2:30). If a machine does not have an IP address, it is not officially on the Internet. Also referred to as an Internet address.

NIC

See Registry.

Registrant

An organisation or entity which licences the use of a domain name (for example RMIT licences the use of rmit.edu.au, Fairfax licences the use of theage.com.au, etc).

Registrar

An organisation or entity accredited to retail domain names to registrants, according to any domain name policies in place (for example Melbourne IT, GoDaddy, Enom, etc).

Registry

An organisation or entity that assigns and maintains a database of domain names on the Internet (for example VeriSign, AusRegistry, Public Interest Registry, DENIC, AUNIC, etc). Registries may also provide a WHOIS service. Also referred to as a Network Information Centre (NIC).

sTLD

A Sponsored Top-Level Domain (sTLD) is a type of Generic Top-Level Domain with restrictive registrant eligibility policies, managed by an independent organisation (for example .aero, .asia, .coop, .museum, .pro, .travel, .cat, .jobs, .tel, etc). .aero is managed by the Société Internationale de Télécommunications Aéronautiques, and registrations are restricted to members of the air-transport industry.

TCP/IP

Transmission Control Protocol over Internet Protocol. This is common shorthand, referring to the suite of transport and application protocols that allow different networks around the world to communicate packets to each other.

TLD

Top-Level Domain (TLD) is the last part of an internet domain name (for example .com, .net, .org, .biz, .au, .uk, .aero, .travel, .info, .nz, etc).

URL

Uniform Resource Locator (URL) is the standard syntax used to identify network retrievable items. URLs are mostly used to identify web or “http://” addresses (for example <http://richmondfc.com.au/default.aspx> and <http://business.theage.com.au/bhp-seeks-rio-talks/20071224-1isl.html>). However, URLs are also used for a wide range of other Internet protocols (for example: <ftp://ftp.microsoft.com> and <mailto:josh@email.nu>). URLs include the domain name. Also known as Universal Resource Locator and Uniform Resource Identifier.

W3C

The World Wide Web Consortium (W3C) is the organisation that sets standards for various web protocols.

WHOIS

An Internet program allowing users to query a database of people and other Internet entities, such as domains, networks, hosts and other registration information which have been submitted to the registration authority.

WIPO

World Intellectual Property Organisation (WIPO) is a United Nations organisation with aims to develop ‘a balanced and accessible international intellectual property system’. WIPO’s Arbitration and Mediation Centre provides dispute resolution services to businesses and individuals, including disputes regarding domain names.

Abstract

A domain name is a unique alphanumeric designation that facilitates reference to the sets of numbers which actually locate a particular computer on the Internet. The registration of domain names is usually administered by domain name registrars who sell their services to the public.

Domain names are a fundamental part of the Internet's user interface. Improving the usability of the Internet depends upon effective domain name policy. This study is intended to contribute to improvement in Internet usability for the end users of domain names. Benefits of more usable domain names include: higher sales, higher customer satisfaction, higher productivity, and reduced support costs.

Domain name policies worldwide vary considerably between, and sometimes even within, countries. As a consequence, end users are inconvenienced by contradictory domain name policies, diminishing the predictability of an entity's domain name, and thus decreasing usability for end users.

The research objective of this study was to develop a set of criteria with which policy makers can evaluate their domain name policies, in order to improve the usability of domain names for end users. In order to address the research objective, the main research question posed was: *What are the criteria for an effective domain name policy?* The research methodology included a literature review, domain name policy examination and an ethnographic narrative recollection of the researcher's professional involvement in the domain name industry.

The literature review found that there is significant existing research examining either domain names or usability in isolation. However, academic research examining the intersection of the two is scarce. The research that does exist, in this somewhat new and untried field of study, describes domain names as part of the web user interface. In practical terms, this is about how people use domain names to access web sites, email addresses and other Internet resources. This foundation concept is built upon by this study. It was established that the predictability (and thus usability) of domain names relies on effective domain name policy. The importance of effective domain name policy is evident in the way that the non-standardised and widely delegated process of domain name policy development leads to unpredictable and inconsistent domain names. These attributes lead to poor usability, observable in decreased productivity, sales, revenues and customer satisfaction, as well as increased training and support costs, development time and costs, and maintenance costs.

The narrative recollection presented the researcher's inside perspective on the domain name industry, with a focus on the end users' effective use of domain names (or domain name usability), and contributed to current theory as intended. The researcher provided first-hand insights into the evolution of the Australian domain name industry within the context of the international domain name industry. The researcher also provided an insider account of the .au domain name policy development process, and a view of policy formation from an international perspective.

Furthermore, a revised version of a submission made by the researcher to an .au domain name policy advisory panel provided a practical example of how end users' needs are brought to the attention of domain name policy makers. This submission provided empirical data in response to the question 'Should .au be opened up to direct registrations (eg. domainname.au)?'.

In order to address the problem of poor domain name usability, a framework for domain name policy evaluation is proposed. This new framework extends the current research that treats the domain name system as a user interface by proposing criteria which address usability and quality concerns. The framework sets out criteria which allow domain name policy makers to critically assess domain name policies with end users in mind. Examples of the criteria for assessing the usability of a domain name space include: understanding who are its intended users and unintended users, whether it is consistent with other domain name spaces, and how meaningful it is in different languages. The framework has the potential to set an international standard for the critical evaluation of domain name policy, and become the basis for further research. The framework can be used to evaluate the domain name policy for any domain name space, regardless of its position in the overall domain name hierarchy.

This study was developed from the researcher's perspective as a participant in the domain name industry. A secondary lens regarding the usability of domain names was then applied. This study has only scraped the surface in terms of how the research field of domain names and usability may be considered together, that is *domain name usability*. For example, means of measuring and testing the usability of domain names is not described in this study. The research methodology for this study was primarily qualitative and interpretive in nature. A comparative, quantitative study of domain name policies globally could provide further insight into areas including: the differences in second level country code domain spaces, language and script implications of domain name spaces, and the semantic meanings of domain name spaces.

1. Introduction

1.1 Domain names

'One of the great successes (of domain names) is that not one person ... knew what IP address they were using' – Paul Mockapetris; Domain Name System Inventor (Rendon, 2003, p. 1).

The Internet is a worldwide, publicly accessible series of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP) (Postel, 1981).

The domain name system was first specified as a technical Internet standard which provides a means of mapping human-readable domain names (Mockapetris, 1983). For example www.rmit.edu.au maps to the computer-readable IP addresses 131.170.40.30 as shown in Figure 1; developed from a DNS vendor's pictorial representation (OpenDNS, 2008).

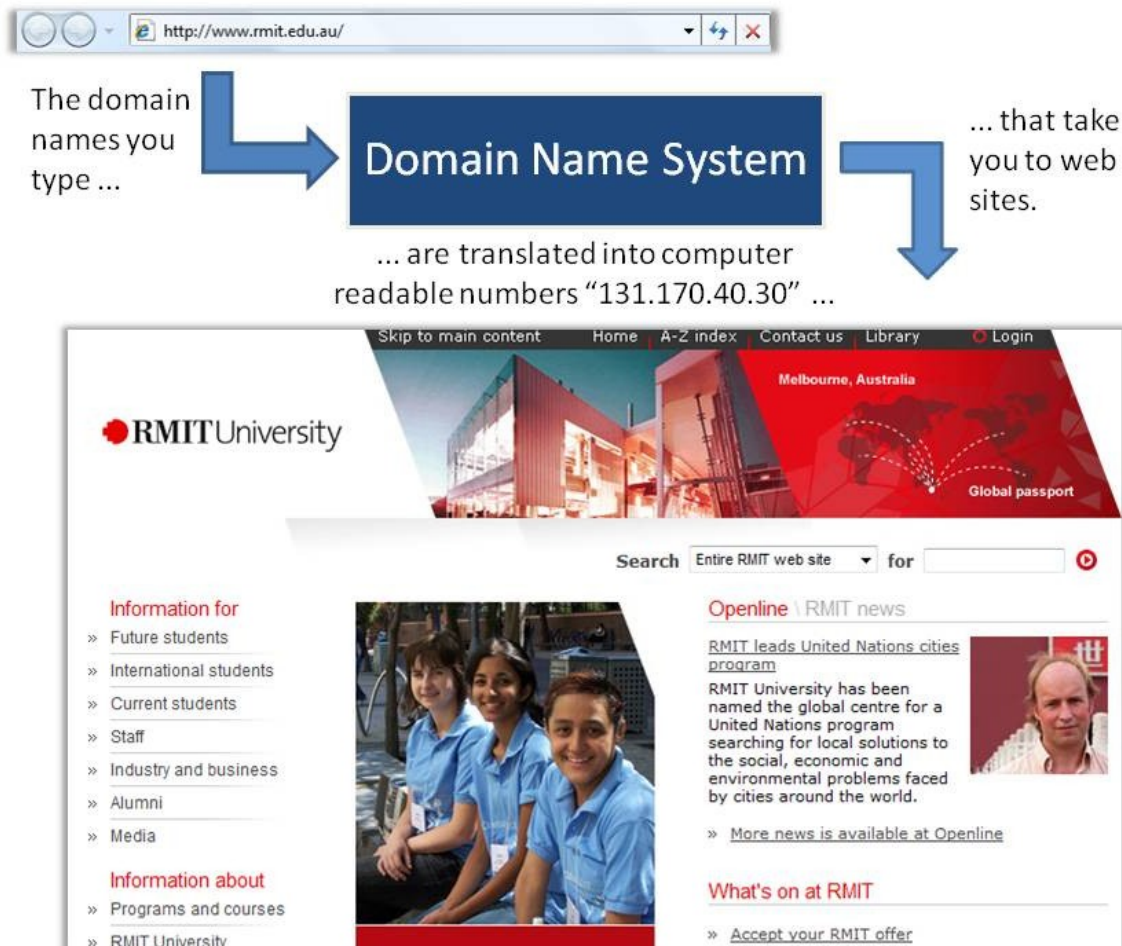


Figure 1: An example of how the domain name system operates

Table 1 presents examples of IP addresses for corresponding domain names of some well known web sites. End users do not need to remember IP addresses for web sites – they access Internet resources by using domain names.

Table 1: Examples of IP addresses for corresponding domain names

IP Address	Domain Name
131.170.40.30	rmit.edu.au
64.233.187.99	google.com
207.46.232.182	microsoft.com
155.144.24.109	auspost.com.au
203.26.51.42	theage.com.au

This study is concerned with the usability of the domain name system for end users. Whilst domain names may be ‘human-readable’, the domain name system is not seamlessly ‘human-usable’. A human usable domain name system is one that fulfils the “basic need ... for a consistent name space used for referring to resources” (Mockapetris P. , 1983, p. 2).

1.2 The case for research

Literature indicates the need for a set of criteria with which domain name policy makers can evaluate domain name polices, in order to improve the usability of domain names for end users. Current domain name policies vary considerably, both between and within countries. Consequently, end users are inconvenienced by contradictory policies, which diminish the predictability of an entity’s domain name.

Nielsen (1999) asserts that users are interested in domain names when assessing the credibility of a destination, which makes predictability of such domain names paramount. Recent research by Cutrell & Guan (2007) found that users spent between 22% and 25% of their time looking at the domain name in search engine results.

The inconsistency of domain name policies, both globally and locally, is illustrated by the following three examples.

Firstly, note the wide variety of the .au domain name extensions used by the selection of Australian research organisations listed in Table 2. It is not immediately apparent where end users should expect to locate these research organisations on the Internet.

Table 2: .au domains used by a selection of Australian research organisations

Domain Name	Registrant
csiro.au	Commonwealth Scientific and Industrial Research Organisation (CSIRO)
nicta.com.au	National Information and Communications Technology Australia (NICTA)
arc.gov.au	Australian Research Council (ARC)
jdrf.org.au	Juvenile Diabetes Research Foundation (JDRF)
cvr.net.au	Centre for Vascular Research (CVR)
acer.edu.au	Australian Council for Educational Research (ACER)
scienceweek.info.au	National Science Week
ae.su.oz.au	University of Sydney School of Aerospace, Mechanical and Mechatronic Engineering
ufor.asn.au	Unidentified Flying Object Research

Secondly, the domain names used by police from a selection of countries, presented in Table 3, reveal the variability of domain extensions. Whilst some commonality exists in the use of government domain name extensions between countries, variations in the abbreviated spelling of ‘government’ demonstrate inconsistency.

Table 3: Domain names used by police from a selection of countries

Domain Name	Registrant
police.uk	United Kingdom Police Service
police.vic.gov.au	Victoria Police (Australia)
police.govt.nz	New Zealand Police
troopers.state.ny.us	New York State Division of State Police
bundespolizei.gv.at	Polizei (Austrian Police)

Domain Name	Registrant
royalthaipolice. go.th	Royal Thai Police
policia. gob.pa	Policia Nacional (Panama)
rcmp-grc. gc.ca	Royal Canadian Mounted Police

Thirdly, some country code domain extensions have been repurposed because they have more than one semantic meaning. These are illustrated in Table 4. VeriSign reportedly (Big Empire, 2007) pays the Pacific island of Tuvalu \$2.2 million dollars per annum to operate the .tv domain, which is targeted at the television and entertainment industry. Laos has handed over .la to the LA Names Corporation; who misinform web site visitors that ‘.LA is the official internet address for Los Angeles’ (LA Names Corporation, 2008, p. 1), when the official ccTLD database says otherwise (IANA, 2008b). Cue Clothing turned to the Cocos (Keeling) Islands for a perfect semantic affinity between their company name and the .cc domain extension. Guernsey’s .gg ccTLD presents the obvious domain extension for horse-betting companies.

Table 4: Domain names used in repurposed ccTLDs

Domain Name	ccTLD Country	Registrant Country	Registrant
hollywood. tv	Tuvalu	USA	Hollywood.tv Inc.
plasticsurgery. la	Laos	USA	Los Angeles Plastic Surgery
cue. cc	Cocos (Keeling) Islands	Australia	Cue Clothing
sportsbook. gg	Guernsey	Australia	Betcorp

1.3 Research objectives

The overall purpose of this study is to develop a set of criteria with which policy makers can evaluate their domain name policies, in order to improve the usability of domain names for end users.

Specifically the study aims to:

- develop an understanding of the Australian domain name industry;
- identify the role of standards and policies;
- analyse and compare domain name policies;
- investigate the domain name system from the perspective of end users; and
- develop criteria to evaluate domain name policy, in order to improve end user usability.

1.4 Research questions

In order to address the research objectives, a number of research questions are posed. The main question to be answered by the research program is:

- *What are the criteria for an effective domain name policy?*

To assist in answering the main question, four subsidiary questions are posed as follows:

- *How is domain name policy formed?*
- *What is the structure of the domain name industry?*
- *Why are policies and standards important?*
- *What are the key elements of usable domain names?*

In answering the questions above, a research method, which involves an ongoing literature review, ethnographic domain name policy examination, and narrative recollection, will be adopted. It is expected that the study has the potential to set an international standard for the critical evaluation of domain name policy and to become the basis for further research.

1.5 Research rationale

'The Board today accepted a recommendation from its global stakeholders that it is possible to implement many new names to the Internet, paving the way for an expansion of domain name choice and opportunity' – Dr Paul Twomey, President and CEO of ICANN, 26 June, 2008 (ICANN, 2008a, p. 1)

The field of domain names, and consequently domain name policy, is relatively new and continuously evolving, leading to inconsistencies in domain name allocation policies. Williams (2003b) identified the need for research to examine the disconnections between global policy development, and the implementation of consistent standards of Internet governance within developing countries.

The domain name extensions used for individuals from a selection of countries (see Table 5), demonstrates the unpredictability of domain name policies. New Zealand’s domain name policy (Domain Name Commission Limited, 2008) provides three individual domain name spaces; permitting a New Zealand Maori technician to register three separate domain names under .maori.nz, .gen.nz and .geek.nz. Using the domain name system; end users do not have clear, understandable and consistent domain name spaces to identify with individuals.

Table 5: Domain name extensions used by individuals from a selection of countries

Domain Name Extension	Country
.name	Global
.id.au	Australia
.me.uk	United Kingdom
.nom.fr	France
.per.nf	Norfolk Islands
.in.th	Thailand
.pp.se	Sweden
.geek.nz	New Zealand
.gen.nz	New Zealand
.maori.nz	New Zealand
.idv.hk	Hong Kong
.fam.pk	Pakistan
.nome.pt	Portugal

Best practice guidelines for ccTLD Managers (CENTR, 2001, p. 4) state that registrant policies may vary from country to country due to local policies, customs and objectives, cultural values, laws and regulations.

This study is important to domain name policy makers because it provides a set of standard criteria by which domain name policy can be evaluated. This study also has the potential to enhance the experience of Internet users by improving the consistency and predictability of domain names – that is, improving Internet usability.

The auDA Name Policy Advisory Panel (2001) found that the prohibition on generic domain names in the ‘.com.au’ second level domain caused a significant level of dissatisfaction. As a result, many Australians chose to register domain names in the generic top-level domains and other country code top-level domains. The Panel opted to make it easier for Australians to license .au domain names. The policy changes recommended by the Panel were adopted (auDA, 2001), and registration of com.au domain names increased by 24% in the following year (AusRegistry, 2003b).

In December, 2007, there were 153 million domain name registrations worldwide which grew 27% compared to the previous year (Verisign, 2008). Over 58 million were country code top-level domain name registrations (Verisign, 2008). The majority (over 70 million domain names) were under .com (Verisign, 2008), followed by .de (Germany) with 11.9 million (DENIC, 2008), .net with 11.0 million (Webhosting.info, 2008), .cn (China) with 10.5 million (CNNIC, 2008) and .uk (United Kingdom) with 6.7 million (Nominet, 2008).

A practical approach to the problem is to introduce a set of internationally standardised domain name policy evaluation criteria. Whether such an approach is widely accepted or not there is a need to develop policies and procedures to ensure consistency and predictability of domain names on the Internet.

The Australian domain name regulator’s recent review of its domain name policies pin-pointed usability as one of four policy objectives for the .au domain name space; ‘To enhance the usability of the .au domain space. The Panel believes that the .au domain should be easy to navigate, simple to understand, not confusing, and responsive to user needs’ (auDA 2007 Names Policy Panel, 2007b, p. 4)

The Usability Professionals' Association (2008) assert that the benefits of usability include: increased productivity, sales, revenues and customer satisfaction, as well as decreased training and support costs, development time and costs, and maintenance costs. This research addresses these issues by treating the domain name system as a user interface for the Internet. This vital user interface requires the understanding of end users to be satisfactorily usable.

1.6 Thesis structure

This thesis is divided into seven chapters. Chapter One provides an introduction into the relevant field of study, that is improving Internet usability through end users' use of domain names. This is followed by the overall research objectives, from which five research questions have been developed. The chapter concludes with the research rationale which sets out the evidence in favour of this research, and highlights the potential benefits.

Chapter Two provides the reader with a methodical review and analysis of the existing literature within the research area. This aims to provide the reader with context for the research questions, the narrative, as well as the proposed domain name policy evaluation framework. The literature review brings together two disparate areas of study, domain names and usability, and demonstrates a deficiency of research on the synthesised topic of domain name usability.

Chapter Three introduces the research methodology, the rationale behind the chosen methodology, and how it will address the overall research objectives. Validity and reliability considerations for the research methodology are also discussed.

Chapter Four examines domain name policy through an ethnographic approach and narrative recollection. In this first person account, the researcher was involved in the domain name industry locally and internationally. This longitudinal study provided the researcher with multiple perspectives, drawing from a rich collection of raw data.

Chapter Five presents an empirical study examining the arguments for and against opening up the .au domain name space to direct registrations. This chapter is based on a submission by the researcher in response to an Australian domain name advisory panel issues paper.

Chapter Six presents and discusses a framework for domain name policy evaluation (with implications for policy and practice).

Chapter Seven presents and discusses the main research findings and suggestions for further research.

2. A literature review

2.1 Introduction

The purpose of this chapter is to provide insight into the current literature on domain names and usability. It is intended to give the reader context for the research questions, the narrative, as well as the proposed domain name policy evaluation framework.

The literature review commenced in the year 2000, and was continually updated throughout the entire research program, which concluded in 2008. The research field of domain names was then, and still remains, an area which continues to change and develop. The literature review was conducted using a range of information sources (described below).

Domain name industry regulators, such as the Internet Corporation for Assigned Names and Numbers (ICANN), Internet Assigned Numbers Authority (IANA), .au Domain Administration Ltd and a selection of country code domain name administrations, were key sources of information. These were beneficial in developing perspectives on domain name policies for top-level domain names (.com, .net, org, and .biz), country code domain names (.au, .uk, .nz, etc) and second-level domain names (com.au, net.au, co.nz, co.uk, etc).

The literature review is grouped into the following sub-sections: domain names, how domain name policy is formed, the structure of the domain name industry, why policies and standards are important in the domain name industry, the key elements of usable domain names, and the criteria for an effective domain name policy.

Current literature regarding domain names exists in a wide range of research areas including: Internet governance (Mueller, Mathiason, & McKnight, 2004), Internet politics (Williams, 2003b), Internet economics (Mueller, 2004), electronic identifiers (Rood, 1999), telecommunications (Yu, 2004), Internet standards (Bradner, 1996), domain name policies (Manheim & Solum, 2004), intellectual property (Rimmer, 2003), trademarks (Lipton, 2005), Internet security (Dhamija, Tygar, & Hearst, 2006), and Internet privacy (von Arx & Hagen, 2002). Literature concerning usability also covers a range of topic areas including: usability standards (ISO, 1998), web site design (Bevan, 1999), web site usability (Nielsen, 2003), human-computer interaction (Earthy, 1998), online marketing and online brands (Murphy & Scharl, 2007).

Predominantly, literature in the field of domain names focuses on issues surrounding Internet governance (Williams, 2003a) and, in particular, concentrates on the evolution of the ICANN organisation (Froomkin, 2003). Intellectual property conflicts between trademarks and domain names are also well researched (Gunning & Flynn, 2001). In contrast, usability literature focuses on web site design ‘look and feel’, navigation, and interaction with computer system user interfaces (Bergman & Johnson, 1997). Usability literature is scant in assessing the usability of the primary entry point to web sites – domain names (Nielsen, 1999). There is a lack of scholarly research at the intersection of these two topic areas – domains names and usability – as illustrated in Figure 2. This gives rise to a relatively new and untested field of study – domain name usability.

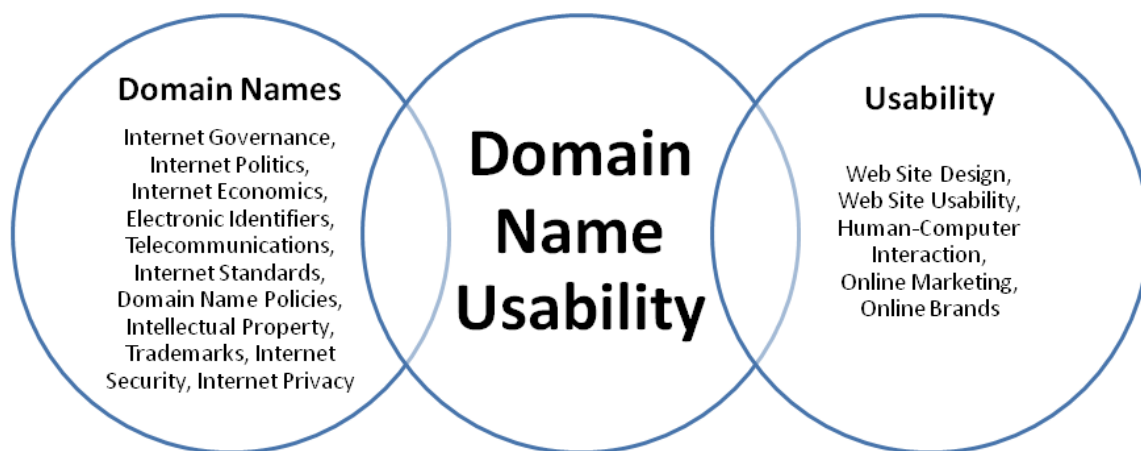


Figure 2: Research areas of interest

2.2 What’s in a (domain) name?

Chapter One explored how the domain name system provides a means of mapping human-readable domain names to computer-readable IP addresses. This chapter provides background information on domain names.

A top-level domain (TLD) is the last part of an internet domain name (for example .com, .net, .org, .biz, .au, .uk, .aero, .travel, .info, .nz, etc). There are 270 top-level domain names directly under the domain name system ‘root’ level (IANA, 2008c). Top-level domains are categorised further as either country code top-level domain or generic top-level domains: of which there are sponsored top-level domains and unsponsored top-level domains. Refer to Table 6 for the comprehensive list of top-level domain names.

Table 6: Top-level domains under the root

Top-Level Domains		
Country Code TLD	Generic TLD	
	Sponsored TLD	Un-sponsored TLD
.ac .ad .ae .af .ag .ai .al .am .an .ao .aq .ar .as .at .au .aw .ax .az .ba .bb .bd .be .bf .bg .bh .bi .bj .bm .bn .bo .br .bs .bt .bv .bw .by .bz .ca .cat .cc .cd .cf .cg .ch .ci .ck .cl .cm .cn .co .cr .cu .cv .cx .cy .cz .de .dj .dk .dm .do .dz .ec .ee .eg .er .es .et .eu .fi .fj .fk .fm .fo .fr .ga .gb .gd .ge .gf .gg .gh .gi .gl .gm .gn .gp .gq .gr .gs .gt .gu .gw .gy .hk .hm .hn .hr .ht .hu .id .ie .il .im .in .io .iq .ir .is .it .je .jm .jo .jp .ke .kg .kh .ki .km .kn .kp .kr .kw .ky .kz .la .lb .lc .li .lk .lr .ls .lt .lu .lv .ly .ma .mc .md .me .mg .mh .mk .ml .mm .mn .mo .mp .mq .mr .ms .mt .mu .mv .mw .mx .my .mz .na .nc .ne .nf .ng .ni .nl .no .np .nr .nu .nz .om .pa .pe .pf .pg .ph .pk .pl .pm .pn .pr .ps .pt .pw .py .qa .re .ro .rs .ru .rw .sa .sb .sc .sd .se .sg .sh .si .sj .sk .sl .sm .sn .so .sr .st .su .sv .sy .sz .tc .td .tf .tg .th .tj .tk .tl .tm .tn .to .tp .tr .tt .tv .tw .tz .ua .ug .uk .um .us .uy .uz .va .vc .ve .vg .vi .vn .vu .wf .ws .ye .yt .yu .za .zm .zw	.aero .asia .coop .jobs .mobi .museum .pro .tel .travel	.arpa .biz .com .edu .info .int .gov .mil .name .net .org

Country code domain names are categorised into three types; those which offer direct registration under their top-level domain (for example mybusiness.cl), those which offer registration under a second level hierarchy only (for example mybusiness.com.au, myname.id.au, myuniversity.edu.au), and those which offer both direct registration and registration under a second level hierarchy (for example mybusiness.cn, mybusiness.com.cn). A subset of the 1775 country code second level hierarchies (Chan, 2008) is presented in Table 7. Characteristics of these country code second level hierarchies are analysed in Chapter Five.

Table 7: Subset of country code second-level domains

<p>com.ac, edu.ac, gov.ac, mil.ac, net.ac, org.ac, nom.ad, ac.ae, co.ae, com.ae, gov.ae, mil.ae, name.ae, net.ae, org.ae, pro.ae, sch.ae, com.af, edu.af, gov.af, net.af, co.ag, com.ag, net.ag, nom.ag, org.ag, com.ai, edu.ai, gov.ai, net.ai, off.ai, org.ai, com.al, edu.al, gov.al, inima.al, net.al, org.al, soros.al, tirana.al, uniti.al, upt.al, ac.am, co.am, com.am, edu.am, gov.am, int.am, mil.am, net.am, org.am, tld.am</p> <p style="text-align: center;">... etcetera (1775 entries in total) ...</p> <p>ac.vn, biz.vn, com.vn, edu.vn, gov.vn, health.vn, info.vn, int.vn, name.vn, net.vn, org.vn, pro.vn, ch.vu, com.vu, de.vu, edu.vu, fr.vu, net.vu, org.vu, com.ws, edu.ws, gov.ws, net.ws, org.ws, com.ye, edu.ye, gov.ye, mil.ye, net.ye, org.ye, ac.yu, co.yu, edu.yu, org.yu, ac.za, alt.za, bourse.za, city.za, co.za, edu.za, gov.za, law.za, mil.za, net.za, ngo.za, nom.za, org.za, school.za, tm.za, web.za, ac.zm, co.zm, gov.zm, org.zm, sch.zm, ac.zw, co.zw, gov.zw, org.zw</p>
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Given the preceding outline of how the domain name system operates, the next section explores the structure of the domain name industry.

2.3 Domain name industry structure

Mueller (2004) and Arnold (2004) described the domain name industry participants. The focus of their research was primarily on the supply side of the industry and therefore omits end users. A wide variety of academic research (for example Mueller, 2004, Arnold, 2004 and Williams 2003b) is available which presents useful perspectives for regulator, registry, registrar, reseller, registrant and specialist domain name industry participants. This contrasts with a paucity of academic research at the other end of the spectrum – research (Nielsen, 1999) presenting the perspectives of end user domain name industry participants.

There are various legal constructs which allow the domain name industry to operate nationally and internationally. The Australian domain name regulator, .au Domain Administration Limited, has formal endorsement to operate the .au domain name space from the Australian Government (auDA, 2000e) together with a contract with ICANN – the global domain name regulator (ICANN, 2001a). The registry, registrar, resellers, registrants and specialist domain name industry participants have legal contracts with .au Domain Administration Limited. The nature of the delegated domain name hierarchy is described in more detail in Section 2.6.

Table 8 extends the existing body of knowledge, described above, by representing end users at the peak of the domain name supply chain. Without end users, the domain name industry simply would not exist.

Table 8: Domain name industry structure

Industry Participant	Description	Examples
End Users	People who use domain names to access web sites, email addresses and other Internet resources.	The researcher uses web sites; www.bom.gov.au , www.facebook.com , www.volvoclub.co.uk , and uses email addresses; josh@email.nu , letters@theage.com.au .
Registrants	An organisation or entity which licences the use of a domain name.	Westpac Banking Corporation is the registrant for the westpac.com.au domain name. Indian Railway Catering and Tourism Corporation is the registrant for the irctc.co.in domain name.
Specialists	Intellectual property lawyers, marketers, web developers, etc.	Phil Argy is a WIPO Panellist (WIPO, 2008) who arbitrates .au domain name licence disputes (auDA, 2008a). Next Digital (2008) develops web sites. Freestyle Media (2008) provide online marketing services.
Resellers	Retail domain names to registrants based on any domain name policies in place. Resellers sell on behalf of registrars.	SnapSite (2008) resells domain name licences on behalf of domain name registrar Planet Domain (2008). NameCheap (2008) resells domain name licences on behalf of domain name registrar eNom (2008).
Registrars	Retail domain names to registrants based on any domain name policies in place.	Melbourne IT (2008) sells domain name licences for .com.au, net.au, org.au, asn.au, and id.au. GoDaddy (2008) sells domain name licences for .com, .net, .org, .biz, .info.

Industry Participant	Description	Examples
Registries	Assign and maintain a database of domain names on the Internet.	AusRegistry (2008) is the domain name registry for com.au, net.au, id.au, asn.au, org.au, gov.au and edu.au. VeriSign (2008) is the domain name registry for .com and .net.
Regulators	Set policy and administrate domain name space.	ICANN (2008b) is the domain name regulator for the ‘root’ domain name space. auDA (2008c) is the domain name regulator for the .au domain name space.

2.4 Politics

‘We are on the verge of a revolution that is just as profound as the change in the economy that came with the industrial revolution. Soon electronic networks will allow people to transcend the barriers of time and distance and take advantage of global markets and business opportunities not even imaginable today, opening up a new world of economic possibility and progress.’ – Vice President Albert Gore, Jr. (1997, p. 1)

The Internet – a globally distributed network – is, by its very nature, borderless. According to some, Internet regulation is an oxymoron (Washington Business Journal, 1998), which gives rise to ‘politicking’ as the means of achieving consensus on how the Internet should be governed. The domain name system is a crucial part of the Internet and requires effective governance to operate.

In 1988, five years after the domain name system was first designed, the DNS inventor – Paul Mockapetris – reflected on the debate about the structure of domain name spaces. He remarked that substantial changes to the organisational structure of the DNS would require a political decision (Mockapetris & Dunlap, 1988).

Paul Mockapetris’ prediction (Mockapetris & Dunlap, 1988) was accurate, with a predominance of academic literature in the field of domain names directed at the processes by which organisations and individuals make decisions; in other words, the politics of the domain name system. Williams’ (2003b) dissertation found that the DNS’ technical operation has political implications, particularly with respect to corporations with commercial interests in mind. Mueller et al. (2004, p. 7) catalogued the various ‘Internet governance regimes’ such as ICANN, United States Justice Department, WTO, ITU and WIPO, noting that they were each driven by a distinct politics.

2.5 Intellectual property

The intersection of domain names and trademarks is another popular area for academic research (for example Lipton, 2005; Rimmer, 2003; and Yu, 2004). Specialists in intellectual property law play an important role in the domain name industry by protecting the rights of their clients against cyber-squatting; that is, the registering of domain names in bad faith.

The difficulty with trademarks and domain names is that they cannot simply be mapped on a one-to-one basis. Trademark schemes allow the same name to exist in different classes. In addition, trademarks are country-based, while the Internet is global. These conditions give rise to naming conflicts in the DNS between parties asserting their legitimate rights. This issue was brought to bear when Time Warner, the holder of the United States trademark ‘Road Runner’ filed a dispute against Roadrunner Computer System’s registration of the roadrunner.com domain name. Time Warner lost the case (Fitzgerald, Gamertsfelder, & Gulliksen, 1998).

Sensibly, the original DNS standard (Postel, 1994, p. 6) separated the process of domain name dispute resolution from the technical and policy functions of domain name regulators;

‘In case of a dispute between domain name registrants as to the rights to a particular name, the registration authority shall have no role or responsibility other than to provide the contact information to both parties.

The registration of a domain name does not have any Trademark status. It is up to the requestor to be sure he is not violating anyone else’s Trademark.’

Trademarks can be used as a basis for registering a .com.au domain name in Australia. However, the .au domain name policy (auDA, 2005) also makes it clear that there is no hierarchy of rights in the DNS. A trademark holder is no more entitled to register a .com.au domain name than a registered business name holder. Therefore, domain names are offered on a first come, first served basis.

Disputes regarding competing rights for domain names are now administered through such mechanisms as the Uniform Domain Name Dispute Resolution Policy (ICANN, 2008) and the .au Dispute Resolution Policy (auDA, 2008a).

2.6 Domain name policy formation

The domain name space can be illustrated by an inverted tree hierarchy. A subset of the domain name space is shown in Figure 3. The domain name system is designed in such a way that each node on the tree can be delegated and then managed by separate entities (Liu & Albitz, 2006). This allows technical and policy administration to occur at any node on the tree.

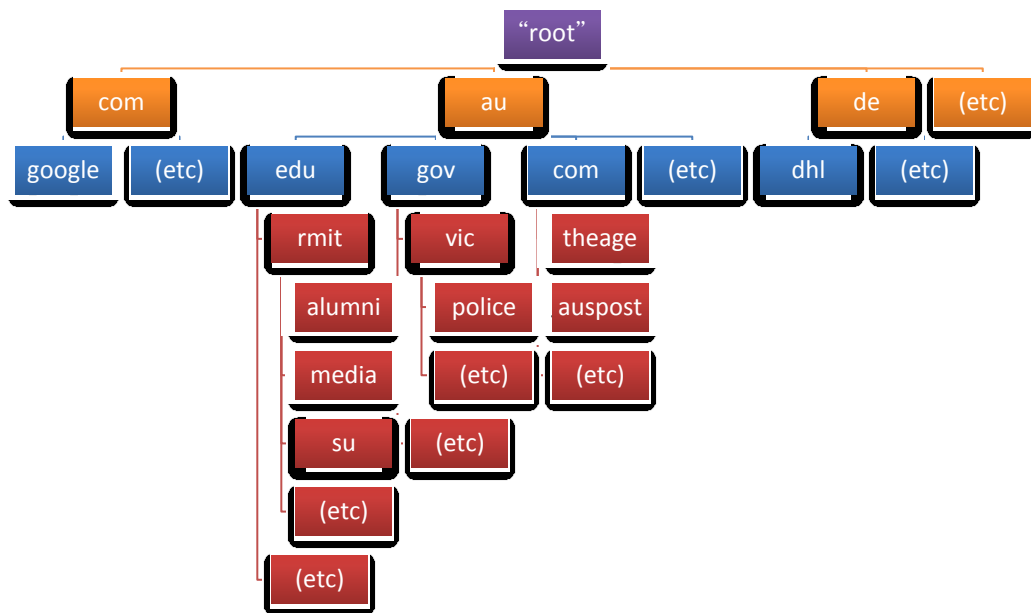


Figure 3: A subset of the domain name space

For example, the ‘root’ node is controlled by ICANN (2008b):

- ICANN has delegated technical and policy administration for the ‘.au’ domain name space to .au Domain Administration Ltd (2008c);
 - .au Domain Administration Ltd has delegated technical and policy administration for the ‘.edu.au’ domain name space to Education.au Ltd (2008);
 - Education.au Ltd has delegated technical and policy administration of the ‘rmit.edu.au’ domain name space to RMIT University (2008).

This has allowed RMIT to establish nodes such as ‘alumni’, ‘media’ and ‘su’. These form the domain names alumni.rmit.edu.au, media.rmit.edu.au and su.rmit.edu.au.

When country code domain names were first created, Internet pioneer Jon Postel wisely steered clear of deciding what was or was not a country. Instead, the Internet standard (Postel, 1994) simply referred to the United Nations-endorsed international standard for country codes – ISO 3166 (2008) – as the means of creating country code domain name spaces. However, the United Kingdom established “.uk” prior to Postel’s standard (Reid, 2007) and still uses it instead of “.gb”.

Kleinwachter (2000) argues that the reliance on a specific *standard* from the very beginning meant that there was no requirement for *policy* on country code domain spaces at the top-level. This distinction between a policy and a standard is important. Alsaiyed (2005) defines a policy as set of overarching principles intended to influence behaviour, in contrast to standards, where uniform actions lead to predictable results. The role of policies in standards development is explored later in this chapter.

Postel (1994, p. 2) noted that there was a wide variation in the way country code managers structured their individual domain name spaces, and that it was each country code managers' role to provide the appropriate policy as 'administrators ... performing a public service on behalf of the Internet community'. This non-standard approach to domain name policy creation is one reason why the domain name system is not clearly understood by end users.

2.7 Perspectives on domain name policy

An International Telecommunications Union survey (Geist, 2004) of 66 country code top-level domain operators found that their highest priority was the efficiency of the domain name system in their country. An *efficient* domain name system could mean standardising domain name policy for the benefit of end users. However, coupled with the questionnaire qualifier 'in your country' (Geist, 2004, pp. 16, 20 & 23) this drives straight to heart of the research problem; there are inconsistencies evident in domain name policies between countries.

Thunem (2007) categorised domain name policy in two dimensions; the number of domains a registrant may hold, and the domain name registration requirement. Thunem's (2007) observations, regarding the implications of changing domain name policies, are of value to domain name regulators and registrants. However, the value of domain name policy changes to end users is not described.

Mueller (1998) examined the choice between generic TLD versus country code TLD spaces as the basis for Internet naming in the top-level. The case was made for generic TLDs at a time when multiple organisations were proposing an expanded generic TLD space. Critically, the study put forward that domain names perform their function when meaningful, and that the semantics of domain names (in the minds of Internet users) cannot be ignored.

A survey (AOEMA, 2000) of 21 Asia Pacific Economic Cooperation members demonstrated the inconsistencies between second level domain name hierarchies for their respective country code domain names. For example, 13 used 'com' (for example com.au) in their second level domain name hierarchies, whilst 5 used 'co' (for example co.jp). The range of second level domain name spaces for individuals was even more diverse; for example id.au, pe.kr, nom.pe, pp.ru, and per.sg. These examples demonstrate the importance of standards for domain name policy development. Non-standard domain name policies present end users with inconsistent and less predictable domain names. Therefore, standards play a key role in the development of domain name policy as discussed in the next section.

2.8 The importance of standards

‘A Standard is a published document which sets out specifications and procedures designed to ensure that a material, product, method or service is fit for its purpose and consistently performs in the way it was intended’. – Standards Australia (2008, p. 1)

Standards improve global efficiency and present end users with consistent and expected means of interacting with systems (Standards Australia, 2008), and therefore improved usability. The International Standards Organisation (ISO) coordinates the creation of international standards. This is achieved through consensus agreements between country groups who represent the interests of suppliers, users and governments (ISO, 2008).

Throughout the world the standard for traffic light colours are red for stop, amber for caution and green for go (ISO, 1999). Tourists visiting other countries do not have to learn this important characteristic of road rules – it is the same as their local rules. Conversely, visitors to Melbourne, Australia are presented with a non-standard road rule called the hook turn (VicRoads, 2008); where a right turn is made from the left-hand lane. Blumenstein (1999, p. 1), a Briton, describes the hook turn as a ‘strange traffic manoeuvre’ and that ‘no one knows why this procedure is necessary’. Similarly, a non-standard road rule for some parts of the United States permits road users to turn right at a red light if the traffic is clear (National Highway Traffic Safety Administration, 1994).

The technical standards which allow the Internet to operate are governed by the Internet Engineering Task Force’s (IETF) process (Bradner, 1996). IETF’s role as the organisation responsible for Internet standards is recognised by ICANN through a memorandum of understanding (ICANN, 2000). These technical standards are what allow the Internet – a globally distributed network – to exist and operate. This means that end users are able to choose from a wide range of operating systems, web browsers and email clients to both connect to and use the Internet seamlessly. This is akin to world-wide, standardised traffic light colours.

These technical Internet standards do not adequately address the issues relating to domain name usability. This is analogous to local, non-standardised road rules. For example, the Domain Name System Structure and Delegation Internet standard (Postel, 1994) refers to the United Nations-endorsed international standard for country codes – ISO 3166 (ISO, 2008) – as the means of creating country code domain name spaces. However, this Internet standard does not specify the domain name structure thereafter. In fact it does the opposite, stating that ‘there are no requirements on sub domains of top-level domains’ (Postel, 1994, p. 5). This sanctions country code domain name regulators to set policies as they wish. The role of policies in standards development is further explored in the following section.

2.9 The role of policies in development of standards

Part of this study's concern is the inconsistencies evident in domain name policies. As described earlier in this chapter, a policy is a set of overarching principles intended to influence behaviour. This contrasts with standards, where uniform actions lead to predictable results (Alsayied, 2005).

This distinction between the purpose of a policy, as opposed to a standard, is essential to understanding why there are inconsistencies in domain name policies. Influencing behaviour through policy alone does not lead to predictable results. Conversely, adherence to standards produces uniform actions, which in turn lead to expected outcomes.

Top-level country code domain names are consistent and predictable, because they are based on an international standard for country codes; ISO 3166 (ISO, 2008). Subsequent levels in the country code domain name hierarchies, where the structure is governed by sovereign policies (not international standards) are where there is a lack of consistency and predictability.

Furthermore, the ad hoc processes for adding new generic top-level domain names create further confusion for end users (Mueller & McKnight, 2003). Mueller & McKnight (2003) propose that ICANN should add 40 new generic top-level domains on an annual basis, allowing the market (consumers and suppliers) to decide which ones succeed. One benefit of such a scheme is its predictability for end users.

2.10 Domain names are a user interface

Usability is the interaction of the user with a product or system, and can be measured through user performance, satisfaction and acceptability (Bevan, Kirakowski, & Maissel, 1991).

Nielsen (1999), an online usability expert, asserts that domain names are part of the web user interface. He adds that people will guess the domain name of sites they either have or have not visited before. Recent research (Cutrell & Guan, 2007) found that search engine users spent between 22% and 25% of their time looking at the domain names in search results. Nielsen (1999) proposes that domain names are used by search engine users to assess the credibility of the destination.

The Victorian Government (2005) affirms that consistent domain name allocation can improve the usability of web sites. Benefits cited include: greater usability for end users, consistent domain name structures across Victorian Government web sites, and a reliable Internet presence through adherence to the domain name allocation standard.

According to Arnold (2007d) there is a paucity of empirical research on domain name branding. Haara & Nilsson (2000) claim that memorable domain names are a key part of promoting online brands. This also supports Nielsen's (1999) contention that people will guess domain names for sites which they have not visited before.

Murphy & Scharl (2007) examined multinational corporations' registrations of country code domain names, in comparison to the .com generic top-level domain name. The study surmises that end users from countries with strong cultural values of masculinity and collectivism are more likely to appreciate their local country code domain name over a .com domain name. The usability of domain names was not explored.

The researcher (Rowe, 2004b) asserted that country code top-level domains play an important part in the global Internet name space. Australia has excellent domain name policy, which has a much higher integrity over generic top-level domains (gTLDs) such as .com, .net and .org. When you visit a .au web site you can be confident that the registrant is an Australian company (com.au/net.au), association (asn.au), an individual (id.au) or non-profit/charity (org.au). This is not the case for generic top-level domains (gTLDs) which have no policy requirements.

One common misuse of online brands is the practice of phishing (Cranston & Weir, 2006) whereby involves fraudsters send emails to purloin personal information, such as a user's Internet banking username and password, using an imitation web site. Phishing relies on end users being deceived into visiting a fake web site in the belief that it is a genuine company's web site. Gartner (2007) estimated that \$US 3.2 billion were lost to phishing attacks in the United States in 2007.

Saharan (2007) and Dhamija, Tygar & Hearst (2006) both separately argue that one of the reasons phishing works is due to a lack of computer system knowledge by end users. In particular 'some users do not understand the meaning or the syntax of domain names and cannot distinguish legitimate versus fraudulent URLs (for example, they may think www.ebay-members-security.com belongs to www.ebay.com)' (Dhamija, Tygar, & Hearst, 2006, p. 2). The phishing problem is further evidence of end users' poor understanding of the domain name system and henceforth, of poor domain name usability.

2.11 Concluding remarks

This literature review has collated, and critically reviewed, the discrete research areas of domain names and usability. This foundational literature review has provided the reader with context for the main research question: *What are the criteria for an effective domain name policy?* and the four subsidiary questions: *How is domain name policy formed?*, *What is the structure of the domain name industry?*, *Why are policies and standards important?*, and *What are the key elements of usable domain names?*. The literature review also sets the scene for the narrative and the proposed domain name policy evaluation framework.

It has been argued that the predictability, and henceforth usability, of domain names relies on effective domain name policy. It has also been demonstrated that the non-standard and widely delegated process of domain name policy development leads to unpredictable and inconsistent domain names.

In order to address the problem of poor domain name usability, a framework for domain name policy evaluation will be proposed. The framework will overlay usability attributes by treating the domain name system primarily as a user interface.

The proposed domain name policy evaluation framework described in Chapter Six sets out the criteria with which domain name policy makers can critically assess domain name policies with end users in mind. The framework has been designed in such a way that it can be easily extended to include new criteria, should further research identify any which will further improve domain name usability.

3. Research methodology

3.1 Introduction

The purpose of this chapter is to analyse the rationale for choosing particular research methodologies to carry out this study. A research method provides guidelines for how information should be gathered and analysed. A well-designed research method will assist in both answering the research questions and drawing valid conclusions (Denzin & Lincoln, 2005).

In order to address the main research question: *What are the criteria for an effective domain name policy?*, two main research methodologies were used – a literature review and a narrative recollection.

By providing secondary data, the literature review provided a theoretical framework for the study. The narrative recollection provided primary data to verify the analysis made on the basis of the reviewed literature. The following sections will discuss the research method adopted in this study.

3.2 Research methodology rationale

3.2.1 Qualitative and quantitative methodologies

The classification of research methodologies is a whole research topic unto itself (Denzin & Lincoln, 2005). One common means of classification is the delineation between quantitative and qualitative research methodologies (Myers, 1997).

Quantitative research methodologies are based on the gathering of information that can be measured and statistically analysed. The researcher must know in advance what is to be measured. When used, these methodologies provide a snapshot of the field of study, which can then be re-used, and extended to larger populations (Straub, Gefen, & Boudreau, 2004).

By contrast, qualitative research methodologies impart a deep, rich textual understanding of a research area. The researcher may have a broad idea of the information to be gathered, however, the final conclusions do not become clear until a substantial quantity of the data has been gathered (Burns, 2000).

Neill (2007) provides a useful comparison between the two research methodology types as presented in Table 9.

Table 9: Features of Qualitative and Quantitative Research (Neill, 2007, p. 1)

Qualitative	Quantitative
<i>'All research ultimately has a qualitative grounding'</i> - Donald Campbell (Miles & Huberman, 1994, p. 40)	<i>'There's no such thing as qualitative data. Everything is either 1 or 0'</i> - Fred Kerlinger (Miles & Huberman, 1994, p. 40)
The aim is a complete, detailed description.	The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed.
Researcher may only know roughly in advance what he/she is looking for.	Researcher knows clearly in advance what he/she is looking for.
Recommended during earlier phases of research projects.	Recommended during latter phases of research projects.
The design emerges as the study unfolds.	All aspects of the study are carefully designed before data is collected.
Researcher is the data gathering instrument.	Researcher uses tools, such as questionnaires or equipment, to collect numerical data.
Data is in the form of words, pictures or objects.	Data is in the form of numbers and statistics.
Subjective - individuals' interpretation of events is important, for example, it may use participant observation, in-depth interviews etc.	Objective – seeks precise measurement & analysis of target concepts, for example, it may use surveys, questionnaires etc.
Qualitative data is more 'rich', time consuming, and less able to be generalised.	Quantitative data is more efficient and able to test hypotheses, but may miss contextual detail.
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.

Furthermore, Trauth (2001) asserts that the degree of uncertainty surrounding a research problem is a determinant of the appropriate research methodology. She adds that the less that is known about a phenomenon, the more difficult it is to measure.

The literature review presented in Chapter Two identified the unmeasured and untested research area of domain name usability. On this basis, a quantitative research methodology is not suitable, as it is unclear at the outset what should be measured. This led the researcher to choose a qualitative methodology (rather than a quantitative methodology), in order to gather a rich set of data without setting the exact analytical method upfront.

3.2.2 Positivist and interpretive epistemologies

Qualitative research can be further classified as positivist or interpretivist, depending on the researcher's approach to the study (Myers, 1997).

Positivism defines the material world as the only reality and makes use of scientific method to find new information about this world (Straub, Gefen, & Boudreau, 2004). Interpretivism allows in-depth exploration of the text, as opposed to number crunching (Myers, 1997).

In addressing the main research question: *What are the criteria for an effective domain name policy?*, this study attempts to develop an in-depth understanding of how domain name policy is formed, the domain name industry, why policies and standards are important, and the key elements of usable domain names.

The literature review analysed the discrete research topic areas of domain names and usability. The intersection of these two topic areas provides a new and untested research area, domain name usability, which is more complex than what could be measured in a positivist approach. Therefore, an interpretivist approach has been used.

3.2.3 Case study and ethnography research methodologies

In qualitative research, case studies and ethnographic methodologies are two types of interpretive research methodologies (Myers, 1999). Ethnography typically involves placing a fieldworker into a foreign environment, from which research notes are taken expressing an insider's point of view (Trauth, 2001). By contrast, case studies rely on knowing what to ask in advance, and take an outsider's viewpoint (Myers, 1997).

Myers (1999) argues that ethnography provides the researcher with an intense, intimate and in-depth understanding of the area in which they work. However, the same author acknowledges some potential limitations of the methodology, including the length of time taken for field work and the lack of breadth provided.

Ethnography, a qualitative interpretivist research methodology, was chosen in order to develop a multifaceted understanding of domain name policy formation from within the domain name industry. A case study approach was deemed unsuitable as it was unclear from the outset who would need to be interviewed, let alone which questions ought to be asked.

3.2.4 Ethnography

‘When used as a method, ethnography typically refers to fieldwork (alternatively, participant-observation) conducted by a single investigator who ‘lives with and lives like’ those who are studied, usually for a year or more.’ - John Van Maanen, 1996 (Genzuk, 2003, p. 1)

Ethnographers can be participants or observers (Genzuk, 2003). The ethnographic observer works inside the social/cultural setting, but attempts to minimise interaction with the people in that setting. The ethnographic participant interacts with the social/cultural setting, influencing and changing the environment to which the researcher belongs.

In this study the researcher adopted the role of an ethnographic participant. The researcher was involved in the domain name industry both locally and internationally, participating and influencing changes across all industry levels. The longitudinal study, which included contextual information dating back to the researcher’s childhood, provided the researcher with multiple perspectives and a rich set of raw data.

The information collected will greatly assist in answering the main research question on what the criteria are for an effective domain name policy. Furthermore, the information will provide an empirical basis for recommendations regarding an international standard critically evaluating domain name policy.

3.3 Data collection

‘The approach to (ethnographic) data collection is unstructured in the sense that it does not involve following through a detailed plan set up at the beginning; nor are the categories used for interpreting what people say and do pre-given or fixed. This does not mean that the research is unsystematic; simply that initially the data are collected in as raw a form, and on as wide a front, as feasible.’ – Genzuk (2003, p. 4).

The data collection for an ethnographic approach must be thorough and detailed, as it may not be apparent which raw data will be of use until it is reflected on in its entirety by the researcher (Myers, 1997).

The data collection methods used included close interaction between the researcher and the field through handwritten notes, public and private email messages, electronic mailing lists (Rowe, 1999b), meeting minutes (auDA, 2001), blogs (Rowe, 2006a), online forums (Rowe, 2004b), wikis (ICANNwiki, 2006), media reports (Sinclair, 2002b) and other web site records (Rowe, 2007b). A Google search for the keywords ‘Josh Rowe + domain name’ (Google, 2008) provides a rudimentary quantification of the magnitude of the researcher’s online contribution to the field – approximately 2,320 web pages.

3.4 Data analysis

Genzuk (2003) contends that the process of analysing data is separate to the interpretation of the data. This study employed a theme-based approach to data analysis. Ryan and Bernard's (2000) approach was first used to develop themes in the literature review, and then to develop the themes from the raw text itself. The themes set out in Chapter Four group together a series of flashpoints in chronological order, and providing context for the main research question, '*What are the criteria for an effective domain name policy?*'. Kruger's (1994) contention that data reduction strategies are essential to data analysis was particularly applicable, given the substantial quantity of raw data recorded.

The interpretation of the data (Genzuk, 2003) involved ascribing meaning to the data analysis through the development of patterns, linkages and relationships within the chosen themes. Once interpretation of the data was complete, conclusions could be drawn.

3.5 Evaluating Ethnography

Notwithstanding the preceding discussion, ethnographic methodology is not usually evaluated in terms of philosophical perspectives such as positivism and emotionalism. However, ethnographies need to be evaluated by some means. While there is no agreement on evaluation standards, Richardson (2000, p. 254) provides five criteria by which researchers using this methodology can be guided. They include:

1. Substantive Contribution: "Does the piece contribute to our understanding of social-life [or community of activity]?"
2. Aesthetic Merit: "Does this piece succeed aesthetically?"
3. Reflexivity: "How did the author come to write this text ... Is there adequate self-awareness and self-exposure for the reader to make judgments about the point of view?"
4. Impact: "Does this affect me? Emotionally? Intellectually? ... Does it move me?"
5. Expresses a Reality: "Does it seem 'true'—a credible account of a cultural, social, individual, or communal sense of the 'real'?"

It is argued that this thesis addresses and satisfies each of these criteria and therefore justifies its use of this methodology.

Rouse (2002) adds that it is impossible to establish truth devoid of human subjectivity, especially in the context of an ethnographic study, where research centres on the meanings that humans give to their experiences in the field.

Kvale (1996) provides two contrasting metaphors to assist researchers in understanding their research journeys. The first is of a miner who sees knowledge as a buried nugget waiting to be found. The second is of a traveller on a journey travelling alongside the research area, changing it and being changed by it along the way. The miner follows the conventions of scientific paradigm, contrasted with the traveller, who, according to Rouse (2002), follows the route of a qualitative, social constructionist.

This research journey was one of a traveller, in which the researcher has both changed and been changed by the research area along a long and arduous path.

3.6 Concluding remarks

This chapter has provided the rationale for using an ethnographic research approach. This type of research methodology is a qualitative interpretivist one. The important elements of data, collection and analysis, alongside issues of reliability and validity, have also been explored and addressed.

This leads on to the narrative recollection in Chapter Four, which provides the researcher's inside perspective on the domain name industry, with a focus on the end users' use of domain names (that is domain name usability). Chapter Five contains a revised version of a submission made by the researcher to an .au domain name policy advisory panel. This provides a practical example of how end users' needs are brought to the attention of domain name policy makers.

4. Using the Internet – an industry insider’s perspective

4.1 Introduction

This chapter presents the narrative recollection from the researcher, based on an ethnographic approach. A series of flashpoints are described which provide context and address the main research question: *What are the criteria for an effective domain name policy?* The flashpoints are listed in chronological order and grouped into themes.

In this first person account the researcher was involved in the domain name industry locally (auDA, 2008e) and internationally (Nominet, 2006), participating directly as an end user (Rowe, 1994), registrant (Rowe, 2002a), specialist (Rowe, 1995b), reseller (Pearce, 2002) and regulator (Douglas, 2001), and interacting with registrars (Rowe, 2007b) and registries (Rowe, 2002b). This longitudinal study provided the researcher with multiple perspectives and a rich set of raw data. Analysis and conclusions are drawn in Chapter Six and Chapter Seven.

4.2 First impressions of computers

I have had an interest in computers for a long time. My early exposure to computers included my uncle’s Apple IIe, my friend’s Tandy MC-10 and Apple Macintosh, and the green screen Amstrad word processing computer that my parents owned. I was always drawn to the machines like a moth to a light. Computers were intriguing to my young, fertile mind, because they presented a blank canvas waiting to be brushed from my palate.

At eleven years of age I was programming the classic snake game in BASIC. I was the only grade six student to type up and print out their assignments. My teachers were suitably impressed. Mrs Salt, my grade six teacher, used to always make a point of how messy my hand writing was and that if I did not get it right I would not be successful in my chosen career. Her prediction proved to be incorrect, thanks to the proliferation of computers.

Through high school my silicon chip fascination continued with more software programming; this time to simulate 20,000 random spins of a roulette wheel to provide additional evidence to my mathematical proof that (a) roulette is an unfair game (on average you will lose \$1 out of every \$37 you bet) and (b) there is no best bet. I had so many arguments friends at university and work that believed that one type of roulette bet was better than another, that I dug out my year 12 assignment and republished it on my web site (Rowe, 1998).

In year 12 I filled out my likes and dislikes into a career questionnaire. It said I should be a teacher, photographer or civil engineer; I looked up the pay rates and chose the highest – engineering. RMIT's Business Administration and Civil Engineering was the course I enrolled in. Not surprisingly I enjoyed and excelled at every subject in which I could use a computer. Whether it was AutoCAD to design sophisticated civil engineering designs, word processing software with laser printed reports (when my university friends only managed dot matrix reports at best) or Pascal programming.

4.3 First impressions of the Internet

RMIT was where I had my first experience with domain names and the Internet. In 1992 the Internet and World Wide Web were young. At first the Internet was exciting because I was able to access the university library catalogue from home at any time of the day, while my friends were limited by the physical library's opening hours and limited number of available electronic terminals.

Then I realised that I had access to information that was more than academic. At an odd hour one day in 1992, I traversed the internet using my green screen text-based browser to find out that Kieren Perkins had smashed the 1500m freestyle world record and won a gold medal at the Barcelona Olympics. I knew the result before everyone else; who had to wait for the delayed telecast. Finding this information was not easy though. I do not remember using a particular domain name; I think I may have used 'Archie', the very first Internet search engine (Li, 2002).

In 1996 I penned a description of the juvenile Internet (Sanctum Internet, 1996) presented verbatim in Table 10.

Table 10: My description of the Internet circa 1996 (Sanctum Internet, 1996)

What is the Internet?

The Internet is a global network of over three million computers worldwide. The Internet is growing faster than any other communications market, roughly doubling every year since 1989. As many as 30 million people use the Internet with thousands of new subscribers joining every day.

The complexity of the Internet is hidden from view giving the appearance of a seamless web of interconnected resources; you can be downloading music from Finland one moment and viewing images in Africa the next! One facet of the Internet is the World Wide Web (WWW). The WWW is a software system that makes the Internet user-friendly and links documents across the Internet, through text, graphics and sound. The Web gives marketers global coverage for a relatively low cost.

According to Business Review Weekly, The key to understanding the Net and its importance is that this is a communications revolution, not an information revolution. Distributing masses of information is one aspect of the Net. On-line commerce in the future will be more about building relationships than selling ... Businesses will be communicating with people, and they will be communicating with businesses and with each other (James O'Toole BRW, May 8, 1995).

4.4 First impressions of domain names

RMIT gave me an email address in 1992 – s924603@minyos.xx.rmit.oz.au – suddenly I had an online identity and could communicate with others worldwide via email and through ‘Newsgroups’ on ‘Usenet’ (Horton & Adams, 1987, p. 1). Newsgroups allow threaded discussion between people all around the world on topics of common interest. My view painted a kaleidoscopic picture of the wide range of domain names being used in the early 1990s, including; fang.omni.com.au, ug.su.oz.au, zeta.org.au, ea3552.nse.att.com, iglou.iglou.com, gate.net, filenet.com, gsusgi2.gsu.edu, cmyk.fook.tek.com, glue.emu.edu, sr.hp.com, vt.edu, vccnw10.its.rpi.edu, yallara.cs.rmit.edu.au, mundil.cs.mu.oz.au, jin.otago.ac.nz, aurora.cc.monash.edu.au, ocs1.ocs.mq.edu.au, and k12.ucs.umass.edu. There did not seem to be much consistency in the way various organisations and people used their domain names. The variability of domain name extensions did not provide me, the end user, with a clear understanding of which entity I was interacting with.

Throughout my time at RMIT University, as an undergraduate student, part time staff member and postgraduate student, the domain names for my email address iterated through s924603@minyos.xx.rmit.oz.au, s924603@minyos.xx.rmit.edu.au, josh@minyos.its.rmit.edu.au, josh@otto.bf.rmit.edu.au, josh@yallara.cs.rmit.edu.au, josh@rmit.edu.au and finally s9204603@student.rmit.edu.au.

The domain name structure generally conformed to by RMIT domain names was: [server-name].[department abbreviation].rmit.edu.au. ‘minyos’ was the name of a high capacity Unix server which provided RMIT staff and students with access to the Internet (Muirden, 1996).

4.5 First impressions of the World Wide Web

I created my first web site in 1994. I coded the web site by hand in Hyper Text Mark-up Language or HTML for short. The web site was titled ‘Josh’s Sanctum’ as a play-on-words; since sanctum means a private place and the Internet was proving to be the exact opposite. The web site address was <http://minyos.xx.rmit.edu.au/~s924603/> - which looks pretty long and antiquated now. At the time however I displayed it with pride in my electronic signature on emails and newsgroup postings. Table 11 contains my announcement of my first web site address to an Internet newsgroup (Rowe, 1995a).

Table 11 : My 1995 newsgroup announcement of my first web site address (Rowe, 1995a)

```
From: s9244603@minyos.xx.rmit.EDU.AU (Joshua Rowe)
Newsgroups: comp.infosystems.www.users
Subject: JOSH'S SANCTUM is online... <---- <---- <---- <----
Date: 2 Feb 1995 01:52:34 GMT

JOSH'S SANCTUM is online....

Let me know what you think of my new web page

http://minyos.xx.rmit.edu.au/~s924603/

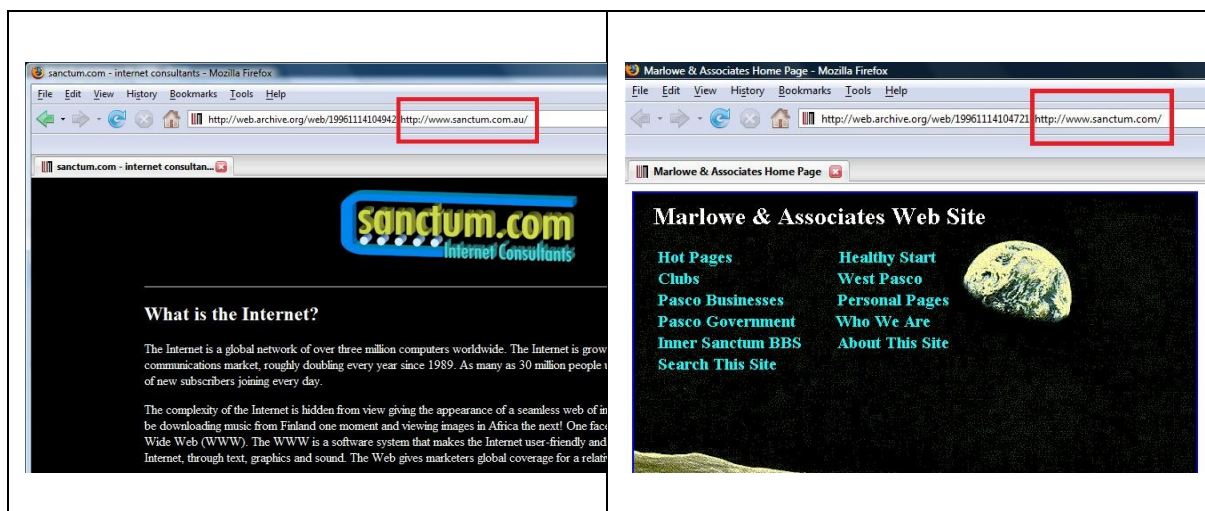
If you want me to add your link to my homepage just drop me a line at
s924603@minyos.xx.rmit.edu.au

--
|~~~~~Joshua Rowe~~~~~|
| Advertise      s924603@minyos.xx.rmit.edu.au      Perception is |
| here          http://minyos.xx.rmit.edu.au/~s924603/      Reality |
|_____B.Eng (Civil)/B.Bus RMIT Melbourne, Australia_____|
```

4.6 Domain name policy

I started a web site development business ‘sanctum.com Internet Consultants’ in 1994. I registered the domain name ‘sanctum.com.au’ through Robert Elz in October 1995. Whilst my business name registration contained the words ‘sanctum.com’ someone else, Marlowe & Associates had already registered that domain name back in 1994. Clearly, I did not fully understand how domain names worked at that stage. Table 12 depicts my sanctum.com.au web site (Rowe, 1996) and the real sanctum.com web site (Marlowe & Associates, 1996) circa 1996.

Table 12: My sanctum.com.au web site on the left (Rowe, 1996) and the real sanctum.com web site on the right (Marlowe & Associates, 1996) – both circa 1996



My fledgling business offered web page packages for small and large businesses. The sanctum.com.au web site advertised single text-based web sites or multi-page web sites with graphics and your own domain name (Rowe, 1996).

Australia was an early adopter as far as the Internet went (Williams, 2003b). There were more domain names registered under .au than any other country code top-level domain in 1991 – a grand total of 29 (Mueller, 1998). Some early .au domain name registration statistics (Arnold, 2007a) suggest that my registration of ‘sanctum.com.au’ was one of the first 2500 com.au domain names to be registered. This can be contrasted with the 2007 announcement (auDA, 2007f) of the 1 millionth .au domain name registered.

4.7 Robert Elz, Melbourne IT

Robert Elz, a Melbourne University staff member at the time, was delegated responsibility for the .au domain name space by IANA in March, 1986 (Clarke, 2004). Policy for com.au domain name registrations was created and administered by Kevin Robert Elz, known as Robert Elz or ‘kre’. The policy (Elz, 1996) that was in force when I applied for my first com.au domain name is still available on Robert Elz’s server. The key elements of the com.au policy were:

- The registrant must be an organisation
- One domain name per organisation
- Domain must closely match organisation name
- Dictionary and generic words not allowed
- Product names not allowed

This was in contrast to the .com top-level domain name policy, which allowed anyone to register as many domain names as they wished on a first-come, first-served basis.

In 1999 Elz described his rationale behind the highly restrictive .com.au domain name policy:

‘My personal belief is that domain names ought to be preserved and used carefully, in just the same way as other resources that we have, not all splurged on the current generation to make as much from as they can on, leaving nothing worthwhile for those who will come in future years.’ – Robert Elz (1999, p. 1)

Robert Elz provided .au domain name registration services free of charge. In 1996, the volume of com.au domain name registrations was too much for Elz to handle alone, so he granted Melbourne IT a five year licence to operate the com.au registry. Melbourne IT commenced operations on October 8, 1996 (Melbourne IT, 1999). Melbourne IT cleared the backlog of 2,400 com.au domain name requests (some of which had been waiting to be processed for 26 week) in just two weeks (Gerrand, 1996). The com.au domain name registration policy did not change.

When I started work with Australia Post in 1996 they did not have a fully fledged Internet email system. They did have an internal email system called ‘ALL-IN-1’ (PC Magazine, 2008). For those at Australia Post who were aware of it, there was a way to interact with others on the Internet, using an X400 email address of the form; Joshua.Rowe@ausgov.apost.telememo.au. This email address had a domain name that was not easily understood by those I corresponded with, as most had domain names ending in ‘com.au’ or ‘edu.au’.

In 1998, Australia Post moved to Microsoft Exchange for email and began using email addresses of the form; Joshua.Rowe@auspost.com.au. This new domain name was much more easily understood by end users than its predecessor. However, the auspost.com.au domain name still presents some ambiguity for end users. When the domain name is communicated verbally from one person to another it can, and has been, misinterpreted as a range of different domain names, including ozpost.com.au (registered to an Australian fence post company) and austpost.com.au (which Australia Post has wisely registered).

In 1999, I sought to register the domain name post.com.au for Australia Post. The word ‘post’ was classified as a generic term so it failed Robert Elz’s policy and Melbourne IT denied the registration. I argued the case for Australia Post’s right to register the post.com.au domain name on the basis that Australia Post was the legislated provider of Postal Services in Australia (Australian Government, 1989) and hence, the term ‘post’ was not generic. After four months of making the case to Melbourne IT’s policy manager, Jan Webster, she allowed Australia Post to register post.com.au. Australia Post had already built brand awareness around the auspost.com.au domain name as well as investment in email and web site systems, so it was decided to redirect the post.com.au web site address to auspost.com.au. The auspost.com.au domain name remains the primary internet address for Australia Post today.

Also in 1999, .au domain name policy allowed only one com.au domain name registration per organisation. Trademarks were not a recognised form of eligibility criteria for the registration of com.au domain names. The policy could be, and was, circumvented by registering separate business names in order to register your business’ product and service names under com.au. This policy loophole created a highly inefficient process for hundreds of thousands of Australian businesses, including Australia Post, who required more than one domain name (Webster, 1999).

4.8 DNS mailing list

The online meeting place for those in the Australian domain name industry was and continues to be the DNS Mailing List; described by DNS Mailing List manager Kim Davies (2008) as ‘*an Internet mailing list that facilitates general discussion on .au related issues. It is an unmoderated forum, and robust debate is encouraged. A light-touch administration policy is enforced*’ (DNS Mailing List, 2008, p. 1). I sent my first email to the DNS Mailing List in June 1999. My message (Rowe, 1999b), provided in Table 13, related specifically to the highly restrictive .com.au domain name policy, which disallowed registration of generic words. Despite this policy restriction, there was evidence that domain names were registered contrary to the com.au domain name policy.

Table 13: My first email to the .au DNS mailing list (Rowe, 1999b)

```

From: Rowe, Joshua [mailto:Joshua.Rowe@auspost.com.au]
Sent: Wednesday, 30 June 1999 12:22 PM
To: 'dns@waia.asn.au'
Subject: RE: [DNS] generic domain names

> -----Original Message-----
> From: David_Wise@fhp.com.au [mailto:David_Wise@fhp.com.au]
> Sent: Wednesday, 30 June 1999 11:08
> To: dns@waia.asn.au
> Subject: Re: [DNS] generic domain names

[snip-snip]

> Also, it would be impossible to make special rules governing
> "generic" domain names because you cannot draw a line between
> what is generic and what is not. Consider
> "www.news.com.au" for example.
>
> David Wise
> Brisbane

check out http://www.mpx.com.au/~ianw/dns.html for a list of the latest
generic and common word domains that have been registered.

Regards

Josh
--
Joshua Rowe B.App.Sci (Comp.Sci.)
Webmaster, eBusiness Systems Integration
Australia Post Headquarters
Email: Joshua.Rowe@auspost.com.au Phone: 03 9204 7335

--
This article is not to be reproduced or quoted beyond this forum without
express permission of the author. You don't know who really wrote it.
227 subscribers. Archived at http://lists.waia.asn.au/list/dns (dns/dns)
Email "unsubscribe" to dns-request@waia.asn.au to be removed.
    
```

The DNS Mailing List archive (DNS Mailing List, 2008) provides a public archive of every message sent to the list and the number of messages sent per month. I have presented these in graphical form in Figure 4. There were over 13,000 messages sent to the list between October 1996 and April 2008.

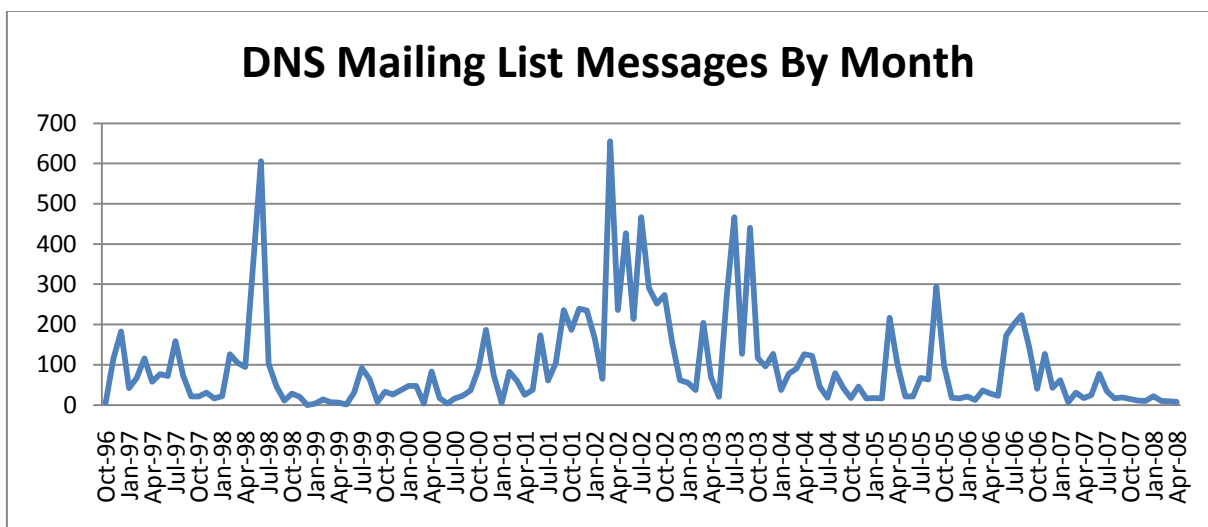


Figure 4: DNS mailing list messages by month

The DNS Mailing List archive of messages provides a useful gauge of domain name policy changes that were developed and implemented over various time periods. This raw data can provide a foundation for further research. For example, in July 2002, when significant .au domain name policy changes were introduced, 467 messages were sent to the DNS Mailing List. Similarly, in May 1998 there were 354 messages sent to the DNS Mailing List, many of which included discussion on domain name policy. Further research could analyse the relationship between the number and topic of messages sent to the DNS Mailing List and the domain name policy changes being developed and implemented in the corresponding time period.

4.9 .au Name Policy Advisory Panel

The .au domain name policies did not meet the needs of the potential Australian domain name registrants. They chose to register domain names under hierarchies other than .au. Chapter Five provides evidence and comparisons of the number of domain name registrations in the .au domain name space versus the .com domain name space.

Prior to the commencement of the .au Name Policy Advisory Panel, there had been three changes made to Elz's com.au domain name policy (Melbourne IT, 1999); these are presented verbatim from Melbourne IT's (2000) website, circa October 2000, in Table 14. Registrations of com.au domain names increased in the year following each of the three policy changes – by 99% for December 1998 year-on-year, 101% for December 1999 year-on-year, and 13% for October 2001 year-on-year respectively (Arnold, 2007b).

Table 14: com.au domain name allocation policy changes between 1996 and 2000 (Melbourne IT, 2000)

com.au Domain Name Allocation Policy

1.0 Historical Background to com.au Naming Policy

On 8 October 1996 the administrator of the .au domain space, Mr. Robert Elz, formally granted Melbourne IT Ltd a licence for the administration of the com.au domain. One of the licence conditions is to not vary Mr Elz's pre-October 1996 policy for the acceptance or rejection of com.au domain name applications without gaining endorsement for the changes from an appropriate Internet community body.

Since November 96 Melbourne IT Ltd has three times received endorsement for the fine tuning of the original policy:

- In February 1997 from the INTIAA DNS forum, to substitute the general rejection of all common words by rejection of more specific classes of words, such as gazetted place names and generic products (goods or services);
- In January 1998 from the ADNA Board, to use the Yellow Pages Index as its guide when interpreting the com.au policy to reject "generic words describing products (goods or services)"; and
- In May 2000 from the auDA Board to confirm that Australian Business Numbers "(ABN)" are an acceptable criterion for a domain name applicant to meet the commercial eligibility requirement.

Through my own experience of the .au domain name registration process, it was obvious to me that the .au domain name policy needed fixing. In May 2000, a colleague from Australia Post pointed out the call for participants to the auDA Name Policy Advisory Panel (auDA, 2000b). His email to me (Vallance, 2000) is provided in Table 15. I joined independently and was a key contributor to the panel that was set up to review .au domain eligibility and allocation policy.

Table 15: Call for participants for the auDA Name Policy Advisory Panel (Vallance, 2000)

```
-----Original Message-----
From: Vallance, Alan
Sent: Wednesday, 17 May 2000 8:26 AM
To: Josh Rowe (Australian Post)
Subject: RE: Domain name question

Here's the ad

REVIEW OF POLICIES IN .AU SECOND LEVEL DOMAINS - CALL FOR PARTICIPANTS

The .au Domain Administration (auDA) Board would like to invite people with
an interest in naming policies for the .au domain namespace to nominate for
a position on the Name Policy Advisory Panel.

The Panel is to review and recommend any challenges to existing domain name
eligibility and allocation policies for all .au second level domains.

Nominations should include a brief statement of relevant skills and
experience and should be emailed to Mr Mark Hughes at ceo@auda.org.au by 31
May 2000.

Further information, including the Terms of Reference and Panel Procedures
may be obtained from Ms Jo Lim (ph 03 9268 7961 or email jo.lim@isr.gov.au)
or from the auDA website (http://www.auda.org.au)

Can't tell whether the panel is a full-timer job or not?

Alan

-----Original Message-----
From: Josh Rowe (Australian Post) [mailto:v-joshr@microsoft.com]
Sent: Wednesday, 17 May 2000 8:18
To: 'Vallance, Alan'
Subject: RE: Domain name question

> Just read the AFR over my cup of Fellini's cappuccino. Saw an ad for
> expressions of interest for participants in the AuDa review
> of second level
> domain names? R U going to nominate yourself? R U across it? Need more
> details or can u find out yourself?

I hadn't heard about this - could you send me the details?

Josh
```

The panel members (auDA, 2000d) included a librarian, lawyers, government representatives, business people, internet industry representatives, associations, technicians, and me. Ten panel meetings were held (auDA, 2001) over a twelve month period to identify the existing .au domain name policies, and to recommend changes to the eligibility and allocation policies (auDA, 2000c).

Initially, the panel undertook a stock-take of the current .au domain name policies. As part of this public report, the panel set out seven ‘important elements in a good names policy’, which are presented in Table 16 (auDA Name Policy Advisory Panel, 2000, p. 2). Of note was the seventh element, which specifically identified end users as key stakeholders, which the domain name system should be designed to benefit.

Table 16: Seven important elements in a good names policy (auDA Name Policy Advisory Panel, 2000)

1. Consistency. A common set of principles and rules which apply to everyone, while also permitting as much diversity as needed to make the system responsive.
2. Promotes the integrity of the DNS. Rules must be clear, simple and technically feasible, from both administrative and user perspective. Applications should be simple to process, and public information should respect the privacy concerns of domain name holders while also ensuring registry information is robust, reliable and reasonably accessible.
3. Respects the rights of third parties. Naming should be consistent with the rights of individuals, registered businesses, copyright, trademarks, and other intellectual property. Name policy should be fair and promote trust in the system.
4. Flexible and extendable. Able to take account of changes in the way consumers use the Internet, business operations and the overall name structure; for example. could accommodate wider range of domain names, much more extensive use of personal domain spaces, globalisation and alliance structures.
5. Supports competition. Must be consistent with decisions already made - support competition, and be managed consistently with industry self-regulation. And prevent registrar shopping - or at least registrar shopping for the wrong reason (ie. inconsistent application of common rules).
6. Has regard to international standards and best practice - while also reflecting Australian community standards and identity.
7. Encourages stakeholder participation to ensure that the DNS operates for the benefit of all domain name holders and Internet users.

The Panel recommended changes to the domain name eligibility and allocation policies for .au domain names. The Panel's report described ten 'desirable attributes of a good domain name policy', presented in Table 17 (auDA Name Policy Advisory Panel, 2001, p. 6), compared with the seven put forward in the initial report. Notably, in this final report, end users were not mentioned specifically, with the relevant attribute broadened simply to promote 'stakeholder participation' (auDA Name Policy Advisory Panel, 2001, p. 6).

Table 17: Desirable attributes of a good domain name policy (auDA Name Policy Advisory Panel, 2001)

1. Coherent. A common set of principles, baseline policies and rules which apply to everyone across all 2LDs.
2. Flexible. Responsive to the different needs of different types of domains, and to changing environments.
3. Competitive. Protects domain users as the ultimate beneficiaries of a well-regulated system.
4. Simple. Clear and simple rules, applications simple to process.
5. Robust. Rules must be technically feasible and stable, and registry information should be reliable and publicly accessible.
6. Consistent with other rights. Including intellectual property rights of individuals and businesses.
7. Internationally benchmarked. Has regard to international standards and best practice, while also reflecting Australian community standards and identity.
8. Participative. Promotes self-regulation and stakeholder participation.
9. Fair. Promotes trust in the integrity of the system.
10. Transparent. Adequately addresses privacy and other consumer protection issues.

One of the key challenges for me, and the other members of the panel, were the contradictions that existed between the attributes. For example, it could be argued that end users will be more likely to predict a domain name which has been registered in accordance with a domain name policy that promotes consistency over flexibility. The auDA Board's priority was made clear when they approved the panel's recommendations noting that the *'new policy rules will also provide a greater degree of consistency and predictability in the allocation of .au domain names'* (auDA, 2001, p. 1). The media release was not specific about which stakeholders would benefit from greater consistency and predictability – registrants were the obvious stakeholders, however, what of the end users of domain names?

The policy changes recommended by the Panel, which included allowing Australian businesses to register more than one domain name per organisation, were adopted (auDA, 2001). The number of .com.au domain name registrations increased by 24% in the following year (AusRegistry, 2003b).

4.10 Regulatory evolution of the .au domain name space

It took several attempts to transform the Australian domain name industry's regulation from Robert Elz's volunteer effort into the .au Domain Administration Ltd, the industry and government supported self-regulatory body which operates today.

Arnold provides a good summary of the regulatory evolution from both historical (Arnold, 2007a) and landmark (Arnold, 2007c) perspectives. My narrative recollection does not attempt to reproduce what already exists in academic studies. Instead, it focuses on my own perspectives as an industry insider throughout these changes.

Nearly one million Australian households had home Internet access in 1997 (Australian Bureau of Statistics, 1998) contrasted with five million households in 2007 (Australian Bureau of Statistics, 2007). This rapid growth in home Internet usage in the late 1990s led to more domain names being registered (Arnold, 2007b), applying stress to the volunteer effort (Tonkin, 2001) of Robert Elz, who acted as the regulator, registry and registrar for most .au domain names (Williams, 2003b).

An initial attempt at establishing a regulatory function for the .au domain name space was spawned from a 'Summit Meeting on Internet Domain Name System'; co-ordinated by the Internet Industry Association of Australia (1996). The summit was held on July 23, 1996 and resolved to develop policies through a consultative process that would address: guidelines for the registration of second level domains under .au; obligations of .au registrars; operations of the .au registry; process for dispute resolution; and governance of the domain name allocation system.

On Thursday February 20, 1997, Peter Gerrand, then Melbourne IT chief executive officer, composed an email (Gerrand, 1997, p. 1), provided in Table 18, which described 'the necessary steps for creating a representative industry self-regulatory body, provisionally named the Australian Domain Name Authority (ADNA)'.

Table 18: Peter Gerrand’s (1997) email regarding the establishment of the Australian Domain Name Authority

From: Peter Gerrand <ceo@MelbourneIT.com.au>
To: Luke Carruthers <luke@magna.com.au>,
pvf@sydney.phillipsfox.com.au, simon@internode.com.au,
Pauline.van.Winsen@uniq.com.au, kim@cynosure.com.au, mmalone@iinet.net.au,
gih@telstra.net, hugh@connect.com.au
Subject: Drafting Group for Setting up Australian Domain Name Authority
Date: Thu, 20 Feb 1997 18:32:21 +1000

[..]

As I understand it, the task is:

To set out the necessary steps for creating a representative industry self-regulatory body, provisionally named the Australian Domain Name Authority (ADNA). It will be the responsibility of ADNA to determine and oversight policies on the administration of Second and Third Level Domain Names within the .au name-space. In the development of its policies ADNA must carry out public consultation processes, so that its final policies will be accepted by the industry and by the relevant regulators (ACCC, ACA) as being the proper outcomes of industry self-regulation.

In particular, the ADNA will have responsibility of determining:

- (1) the hierarchy of 2LDNs under .au
- (2) the rules for selecting (and deselecting) DNAs to administer 3LDNs
- (3) the policies under which 2LDNs must accept or reject 3LDNs.

[I suggest it would be useful to also assign the ADNA the responsibility for producing

- (4) a Code of Practice for DNAs, and
- (5) a Code of Practice for ISPs in registering DNAs on behalf of their clients.]

A self-described ‘observer of the progress’ provided a scathing report on ADNA’s first year of operation. Mayo’s (1998) email, provided in Table 19, proffered that ADNA’s twelve months of existence had delivered ‘positive statements of position’, but no tangible outcomes.

Table 19: ADNA's first year report according to Leni Mayo (1998)

```
From: Leni Mayo <leni@moniker.net>
Date: Mon, 04 May 1998 10:46:24 +1000
Subject: ADNA first year report

ADNA has been in existence for two weeks short of a year now, so I thought I'd sketch an
annual report from the point of view of an observer of the progress. Sorry that it should
be so negative, but after one year I think it's reasonable for the community to have
expected tangible results, as opposed to positive statements of position etc.

Let's hope the year 2 scene looks significantly better.

Leni.

1. No delegation of authority from the .au authority, Robert Elz.

2. No progress on building consensus.
   Parties that remain outside the process include: ISOC-AU, AVCC,
   .net.au, .edu.au, and as of a few months ago .asn.au.
   Evolution: none, except that .asn.au has withdrawn from the process.

3. No compromises visible on the "roadblock" issues, including
   board representation or membership criteria.
   Evolution: none, membership and board composition is identical,
   except for resignations and withdrawals. Perhaps this is a little
   strong, and one or two folks have come on board?

4. No significant sources of funding have been put in place.
   Evolution: none, ADNA still relies on $1,000 contributions
   from the (<10) members.

5. No chair has been formally appointed.

6. No operational infrastructure
   No office space, staff, network connectivity or software
   infrastructure (eg. SRS) has been tendered or put in place.

7. No new second-level domains
   Evolution: two forums focused on trademark community.
   Proposals for both .pr.au and .tm.au strongly rejected.

8. No competition within any second-level domain.
   Evolution: documents written etc, but no tangible results.

ADNA members (all of whom are on the board):
Luke Carruthers IIA luke@magna.com.au
Peter Gerrand Melbourne IT ceo@MelbourneIT.com.au
Mark Hughes Tradegate mark.hughes@ccamatil.com
Kevin Dinn IIA kevin@zip.com.au
Allan Horsley ATUG horsleya@atug.org.au
Michael Malone ASN.AU mmalone@iinet.net.au
Peter Cooper WAIA comrade@obverse.com.au

--
Leni Mayo                Ph:    +61 3 9428 5530
                          Fax:    +61 3 9428 5902
Moniker Pty Ltd          E-mail:  mailto:leni@moniker.net
Internet Domain Names    WWW:     http://www.moniker.net
```

The next attempt to build consensus for the regulation of the .au domain name space was the .au Working Group. In this case, the National Office of the Information Economy (NOIE), an Australian Government agency, facilitated the process. Sandra Davey (1998) announced this newly formed group to the Link Mailing List on December 23, 1998, as presented in Table 20.

Table 20: Sandra Davey (1998) announces the formation of the .au Working Group

```
New .AU Working Group on Australian Domain Names
Sandra Davey sldavey@fl.asn.au
Wed, 23 Dec 1998 14:21:50 +1100

[...]

Dear Linkers,

The newly formed .AU Working Group on Australian Domain Names, recently created by NOIE,
has launched its public website. You'll find us at http://au.moniker.net

The Working Group has an objective to establish, in conjunction with the Internet
community, an organisation capable of taking over the delegation of the .au namespace by
March 1999.

All documents generated by the Working Group, including minutes and draft documents, are
available for public scrutiny and comment. In addition a public announcement list is also
available so you can be notified instantaneously of new additions and updates to the
website. The Working Group will use this mailing list as the primary way to notify the
community of progress by the Working Group and updates to the site.

The .AU Working Group looks forward to your participation.

Please redirect this mail to interested parties.

With best regards,

Sandra Davey
.AU Working Group
Email: sldavey@fl.asn.au
```

My first interaction with the .au Working Group was through an unsolicited commercial email message, otherwise known as spam, which was sent to me and numerous other Internet Service Providers (ISPs). Larry Bloch used his position on the .au Working Group as justification to send the spam (Bloch, 1999), presented in Table 21. The .au Working Group swiftly and decisively distanced itself from the spam (Davey, 1999b). The irony was that Bloch's spam came from his private 'au.com' domain name space which was, and remains, a direct competitor to 'com.au' domain name space.

I personally experienced the consequence of end user confusion with respect to the separate 'au.com' and 'com.au' domain name spaces. The operators of Sanctum Skin Care registered the domain name 'sanctum.au.com' which was easily confused with my company's domain name 'sanctum.com.au'. Their customers frequently sent orders for skin care products to my company's email address – sales@sanctum.com.au – instead of sales@sanctum.au.com. Sanctum Skin Care offered to purchase the 'sanctum.com.au' domain name for \$800 – an offer which I declined. Eventually, they ceased promoting the 'sanctum.au.com' domain name. They switched to 'sanctumaustralia.com' which was more easily understood by end users, as evidenced by the decline in skin care product orders incorrectly placed with my company.

Table 21: Larry Bloch's (1999) spam email – sent to ISPs regarding the .au Working Group

From: larry.bloch@netregistry.au.com <larry.bloch@netregistry.au.com>
Sent: Wednesday, 17 February 1999 22:29
To: josh@sanctum.com.au
Subject: OPEN LETTER TO AUSTRALIAN ISPs

Dear Joshua

As you know NOIE has convened a Working Group to manage the transition of control of the .au domain space to a new body (.au Domain Administration - auDA).

The .au name space is a hugely vital component of the Australian Internet community and is relevant to the growth and prosperity of our industry.

As a member of the Working Group, NetRegistry is striving to ensure that the migration of the National Resource stays true to a number of principles:

1. Any interested ISP should be able to participate, if desired.
2. Any interested ISP should be able to compete on a level playing field with current 2LD monopolies.
3. The new structure should ensure that .au is managed to the highest standard of service for the lowest possible cost per domain name.

NetRegistry will be standing for election to the board of this new entity on these principles. We would like to represent the views of the ISP community.

As such, I would like to encourage as many ISPs as possible to lend their support to these principles so that we can be clear about your preferences. Your participation in the process is vital in ensuring sufficient representation of the supply side of domain registration in Australia.

To represent the concerns of the ISP community fairly, NetRegistry has prepared a series of questions to guide our participation in the Working Group and any future Regulatory Body. Please go to <http://www.tell-us-what-you-want.au.com/> and complete the questionnaire. Results will be sent to all participants and presented to the members of the WG for consideration.

References:
au Working Group website: <http://au.moniker.net/>
ISP Questionnaire: <http://www.tell-us-what-you-want.au.com/>

Regards

Larry Bloch
Chief Executive Officer
NetRegistry Pty Limited
email: larry@netregistry.au.com
Office: +61-(0)2-9699 6099
Fax:+61-(0)2-9699 6088

The working group set itself a tight timeframe, aiming to establish the new regulatory body for administration of the .au space by March 1999 (.au Working Group, 1999). Despite the initial distraction of Bloch's spam, the .au Working Group rapidly produced a constitution for the proposed new organisation 'au Domain Administration Ltd' (Davey, 1999a). The importance of end users was highlighted through one of the five objectives of the new organisation, which stated that it 'must be representative of all members of the Internet community in Australia - users and suppliers of domain name services, and general users of the Internet' (.au Working Group, 1999, p. 1).

One month after the target date, the first meeting of the .au Domain Administration (auDA) was held in Melbourne (Davey, 1999c). The first policy to be released from auDA was not a domain name policy per se, but a policy on how to *create* domain name policies through consultative public advisory panels (Davey, 1999d).

Two auDA advisory panels were empanelled in 2000; the first tasked with producing policies for allocating .au domain names (auDA, 2000b), and the second to with developing a competition model for the .au domain name industry (auDA, 2000a). My involvement in the first panel was explored in section 4.9. December 2000 saw auDA receive endorsement from the Australian Government (Disspain, 2000) and in August 2001, the .au domain name space was re-delegated from Robert Elz to auDA to manage (IANA, 2001). On July 1, 2002, the new .au competition model, and the new domain name allocation rules, were successfully implemented (Sinclair, 2002a).

The growth of the Internet leading up to 2000 (Australian Bureau of Statistics, 2000), and the lack of an established regulator for the .au domain name space, provided fertile ground for the deceptive practice of domain name slamming.

4.11 Domain name slammers

‘Slamming’ is where a consumer’s ‘service’ is switched over from one company to another without the consumer’s express knowledge or consent (Ofcom, 2007). For example, in the United States Federal Communications Commission established rules in 1998 to address Telephone Slamming in the deregulated United States telecommunications industry (Federal Communications Commission, 2008).

Domain name slamming is where a domain name seller sends marketing notices which are made to look like legitimate invoices (ComputerWire, 2002). These notices are designed to deceive domain name registrants into transferring their existing domain name to the domain name seller or registering a new domain name similar to one they already have with the domain name seller. The domain name registrant’s contact details are usually sourced, legally or illegally (Federal Court of Australia, 2007), from a publically available registrant database. For example, the misleading and deceptive domain name marketing notice (Federal Court of Australia, 2004) in Figure 5 was sent to me as the registrant of ‘whatsinaname.com.au’. However, the notice offered me the new registration of ‘whatsinaname.net.au’, rather than a renewal of my existing domain name.

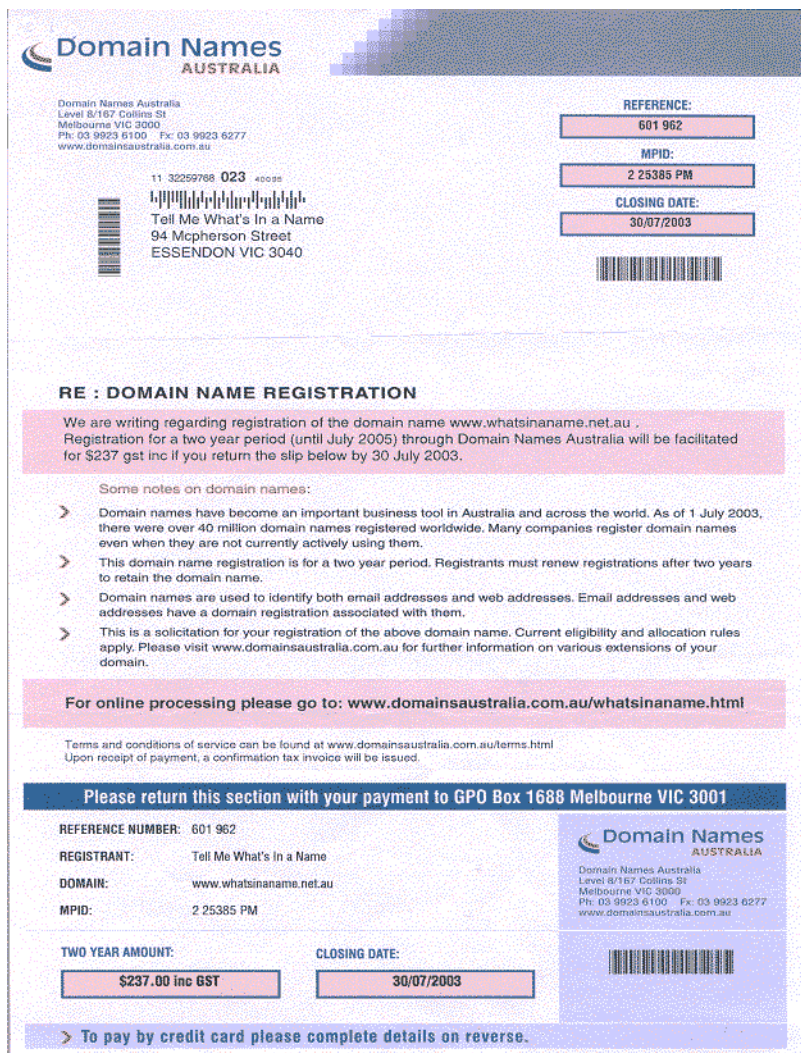


Figure 5: Example of a misleading and deceptive domain name marketing notice (Federal Court of Australia, 2004)

The Australian Competition and Consumer Commission (2006) contend that such notices exploit domain name registrants' lack of understanding of the domain name system's intricacies. In other words, the domain name system is not clearly understood by domain name registrants.

In 2000, Australia was ripe for domain name slammers (Davies, 2003) due to the following factors:

- auDA had not been established as the regulator yet;
- the dot-com market boom saw .com.au domain name registrations grow by 60% from 1999 to 2000 (Arnold, 2007b); and
- the .au domain name registrant database was available for anyone to download (Rowe, 1999c).

The official-sounding National Internet Registration was the first domain name slammer I encountered in 1999 (Rowe, 1999a). For a fee of \$47 National Internet Registration promised a listing in an online business directory. The invoices led domain name registrants to believe that their domain name was up for renewal, when it was in fact seeking a fee for a business directory listing. The Australian Competition and Consumer Commission (2000) found the company had contravened the Trade Practices Act by engaging in misleading and deceptive conduct, and ordered that corrective actions be taken.

Domain name slammers have used various marketing techniques to convince less informed domain name registrants to buy domain names which they do not necessarily need. Some of these techniques include: sending marketing notices which could be mistaken for an invoice; offering registration of a new domain name very similar to one that the domain name registrant already has; and using an official-sounding company name.

It is understandable that domain name registrants have been misled by deceptive offers, given that the company names of domain name slammers are very similar to official regulators, registries and registrars. When the official Australian domain name regulator, .au Domain Administration, complained that ‘Domain Name Authority of Australia’ was misleading, they changed their name to ‘Discount Domain Name Services’ (Sinclair, 2000). Examples of some of these confusingly similar company names, compared to the official company names, are provided in Table 22.

Table 22: Official-sounding company names used by Domain Name Slammers

Domain Name Slammers	Official Regulator, Registry and Registrars
Domains Australia	.au Domain Administration
Domain Names Australia	AusRegistry
Domain Name Authority of Australia	Domain Registration Services
Domain Services	NetRegistry
Internet Name Group	
Internet Name Protection	
Internet Registrations Australia	
Internet Registry	
NetRegister	

I took it upon myself to begin publishing the notices on my web site (Rowe, 2001) so that domain name registrants were aware that they were marketing notices, rather than invoices requiring payment. Melbourne IT's Chief Technology Officer, remarked that my publication of the domain name notices was a 'valuable service in keeping track of the various marketing practices in the industry' (Tonkin, 2002, p. 1).

One domain name slammer, Internet Name Group, threatened legal action against me claiming that I was infringing their copyright by publishing the notices on my web site. With assistance from Maddocks Lawyers (2008) their claims were strenuously denied (Rowe, 2001). I did not hear back from the complainant again, and copies of their notices remain on my web site to this day (Internet Name Group, 2001b). After successful litigation from the Australian Competition and Consumer Commission (2002) against Internet Name Group, Internet Name Group ended up in administration (auDA, 2002). This was also the catalyst for the development of Australia's first domain name industry code of practice (Douglas, 2001). The code of practice sought to reduce the deceitful practice of domain name slamming, amongst other things.

However, the creation of the industry code of practice (auDA, 2001), and the potential threat of litigation from authorities, did not deter more domain name slammers from entering the market. In fact, the opposite occurred; more domain name slammers began operating in the Australian domain name marketplace. I continued to publish their marketing notices on my web site.

Each domain name slammer uses a range of techniques to mislead and deceive unsuspecting domain name registrants. The technique of most relevance to this study is where domain name slammers send a notice for the registration of a new domain name, similar to that already held by the domain name registrant. Table 23 provides a list of these types of the offers made by domain name slammers.

Table 23: Marketing notice offers made by domain name slammers

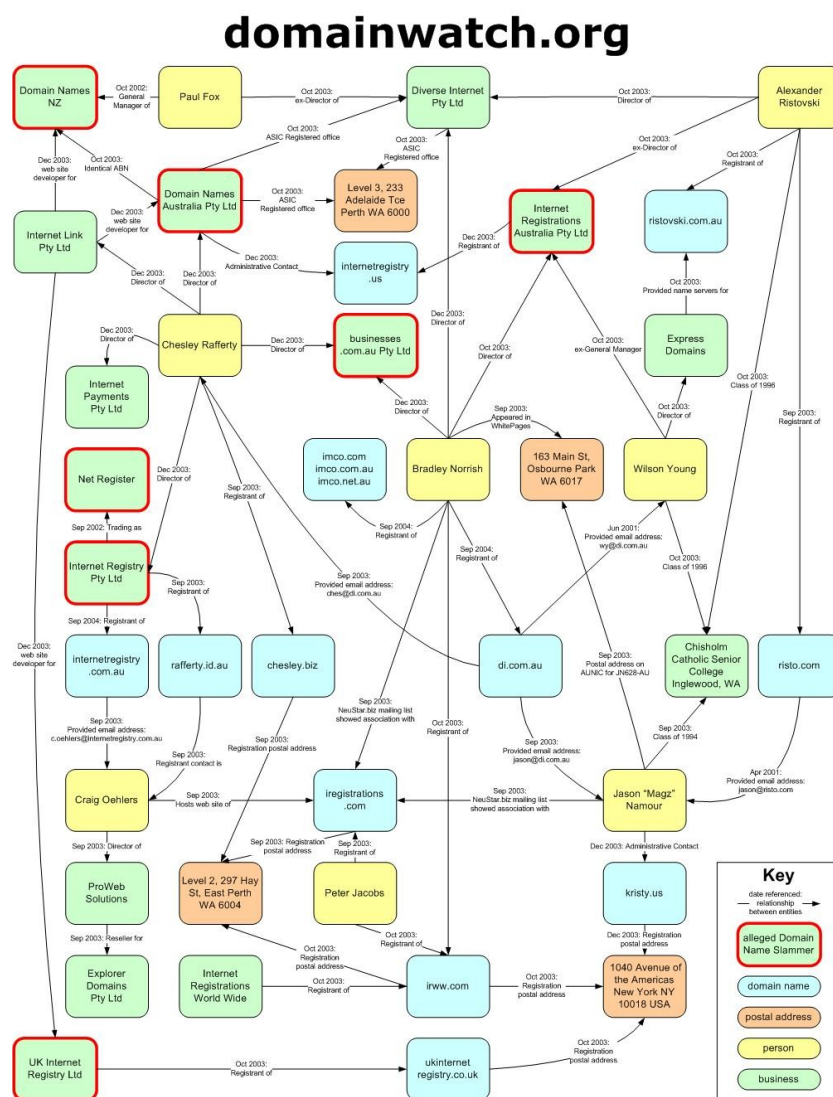
Domain Name Slammer	Marketing Notice Offer (example domain names used)	Domain name offered	Domain name registrant's existing domain name
Internet Name Group (2001a)	'REGISTRATION ADVICE' notice for new registration of example.com sent to registrant of example.com.au	example.com	example.com.au
Domain Names Australia (2003b)	'DOMAIN UNREGISTERED' notice for new registration of example.com sent to registrant of example.com.au	example.com	example.com.au
Domain Names Australia (2003a)	'DOMAIN NAME REGISTRATION' notice for new registration of example.net.au sent to registrant of example.com.au	example.net.au	example.com.au
Domain Names Australia (2003c)	'INTERNET NAME CURRENTLY UNREGISTERED' notice for new registration of example.com sent to registrant of example.com.au	example.com	example.com.au

According to auDA Chief Executive Officer, Chris Disspain, 9000 domain name registrants responded to the third notice in Table 23 by registering the 'net.au' extension of their existing 'com.au' domain name (Gray, 2003). This response represented 2.5% of the 355,000 'com.au' domain name registrants at the time (AusRegistry, 2003a). It is not clear whether all 9000 domain name registrants were deceived into believing that they were renewing their existing 'com.au' domain name, or whether they were genuinely interested in registering the new 'net.au' extension of their domain name.

In September 2003, it became apparent to me that a number of the people operating the various domain name slamming organisations were linked. I published my thoughts (Rowe, 2003b), drawing instant reactions from the domain name slammers and associated parties (Namour, 2003). Having been publically exposed, they sought to attack me personally and publically (Norrish, 2003). This strengthened my resolve to continue exposing unscrupulous operators in the domain name industry.

Whilst the domain name slammers chose to attack me personally, my interest was in publicising their misleading and deceptive behaviour. It is my belief that past behaviour is usually the best predictor of future behaviour. As long as domain registrants believe they are being misled and deceived, I will continue to monitor those companies and people responsible.

My initial post on the DNS mailing list (Rowe, 2003b) evolved into a basic text website (Rowe, 2004a), which in turn became the domainwatch.org blog (Rowe, 2006a), featuring a diagram (Rowe, 2004c) of the links between the related entities (see Figure 6). The blog was developed incrementally, using information from the domain name industry, duped domain name registrants, various authorities and even competing domain name slammers.



Disclaimer: The domainwatch.org page has been developed using publicly available information. While due care has been exercised to ensure the accuracy and currency of the material contained on this web page, the editor strongly recommends that users exercise their own skill and care with respect to its use and seek professional advice where appropriate. While the information provided is considered to be true and correct at the date of publication, changes in circumstances after the time of publication may impact on the accuracy of the information. The editor will consider requests to correct factual errors if accompanied by reasonable proof of the error(s).

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Figure 6: Pictorial representation of information on the domainwatch.org web site (Rowe, 2004c)

In an attempt to silence me, two of the domain name slammers, Bradley Norrish and Chesley Rafferty, threatened me through their lawyers with defamation proceedings. Through my lawyers, their claims were denied. It was further pointed out that any damage to their reputations was not solely the result of my comments, given the wide publicity surrounding allegations and civil claims of misleading and deceptive conduct made against them by the Australian Competition and Consumer Commission (2003), .au Domain Administration Ltd (2004), New South Wales Minister for Fair Trading (Meagher & Hodgkinson, 2003), New Zealand Commerce Commission (2003), and the New Zealand Domain Names Commissioner (2003). The allegations and civil claims were widely reported in, amongst other publications: The Australian newspaper (Mackenzie, 2003); the Australian Financial Review newspaper; the Australian Broadcasting Corporations' Radio National and various local radio stations; The Age newspaper (Elias, 2004); the Sydney Morning Herald newspaper; including reports of statements to the New South Wales Parliament about Mr Rafferty and Domain Names Australia Pty Ltd's misleading and deceptive conduct by the New South Wales Minister for Fair Trading, the Courier Mail newspaper; the New Zealand Herald newspaper; including reports of statements by the New Zealand Commerce Commission and Domain Names Commissioner; the Australian Competition and Consumer Commission website; the .au Domain Administration Ltd website; the New Zealand Commerce Commission website; the New Zealand Domain Names Commissioner's website; and various online publications such as Computerworld Australia; Computerworld New Zealand; and ZDnet.

I did not hear back from Norrish, Rafferty or their lawyers again, and my web site remains active (Rowe, 2006a). Furthermore, the web site has been used as a source of information to drive subsequent court cases against domain name slammers (Taylor, 2006).

The ACCC and auDA took Chesley Rafferty and Domain Names Australia to court, alleging misleading and deceptive behaviour, and won (Federal Court of Australia, 2004). The ACCC's (2004) main contention was that the notice offered a domain name which was substantially similar to businesses' existing domain names. This demonstrates that domain name registrants have a poor understanding of the domain name system, even when it comes to differentiating between the domain name they originally registered and a new, slightly different domain name offered to them.

Meanwhile, UK regulator, Nominet, took Bradley Norrish, Chesley Rafferty and UK Internet Registry to court for copyright infringement of the UK WHOIS database and won \$2.3 million in damages (Federal Court of Australia, 2007). The domain registrant details copied from Nominet's WHOIS database were used to send misleading and deceptive notices to UK domain name registrants, in a similar fashion to the Australian notices. In quick succession, Chesley Rafferty (2005) and Bradley Norrish (2006), announced their bankruptcies, promising a return to the industry in three years time.

Domain name slamming is no longer a major issue in the Australian domain name marketplace. However, there are recent examples of international operators attempting to convince domain name registrants in Australia to register domain names under the Chinese .cn top-level domain name space (Bevitt & Michael, 2007).

If the domain name system was better understood by domain name registrants, domain name slammers would be less successful, because their success rests in part on the poor understanding of domain names by domain name registrants. When an offer for a new domain name registration (for example ‘foo.net.au’) is made to an existing domain name registrant of (for example ‘foo.com.au’), a domain name registrant with good understanding of the system should be able to recognise this as a marketing offer, rather than simply a request for a renewal payment.

4.12 auDA board

Following my contribution on the name policy advisory panel, and my relentless campaigns to expose domain name slammers, I was elected to the auDA board by the auDA membership in 2001 (auDA, 2001) for a two year term. I was subsequently re-elected in 2003 (auDA, 2003), 2005 (auDA, 2005) and 2007 (Lim, 2007).

The current auDA board (auDA, 2008e) consists of representatives elected by Supply Class members (Registry Operator, an auDA accredited Registrar, or a reseller appointed by an auDA accredited Registrar, in the .au domain name space) and Demand Class members (those who do not qualify for Supply Class membership), independent directors appointed by the board and the Chief Executive Officer (auDA, 2007c).

When standing for election, candidates are permitted to provide a 100 word statement for circulation to members prior to the Annual General Meeting (AGM). Table 24 shows the evolution of my statements over four subsequent terms, and my strong commitment to registrants and end users of domain names.

Table 24: My candidate statements for election to the auDA board

AGM	Candidate Statement
2001	‘As an Internet user since 1992, a member of the auDA Name Policy Advisory Panel and board member of the Coalition Against Unsolicited Bulk Email (Australia): I believe I have the experience and knowledge to act as a Director on the auDA board.’ (Rowe, 2001)
2003	‘Josh Rowe has over 10 years experience with the Internet. Josh is currently a demand class board member and would like to be re-elected for another term. Josh is a staunch consumer advocate within the Australian domain name industry especially in regards to exposing unscrupulous operators. Josh maintains the .au registrar price comparison web site www.whatsinaname.com.au . Josh is also a director of Australian, Asia-Pacific and International anti-spam lobby groups. More information about Josh Rowe is available on his web site: www.josh.id.au ’ (Rowe, 2003a)
2005	‘Josh is currently a demand class auDA board member and would like to be re-elected for another term. Josh Rowe has over 12 years experience with the Internet. Josh is a staunch consumer advocate within the Australian domain name industry especially in regards to exposing unscrupulous operators, see: www.domainwatch.org . Josh maintains www.whatsinaname.com.au which provides a Price Comparison of auDA Accredited Registrars. Josh is also a director of Australian, Asia-Pacific and International anti-spam lobby groups. More information about Josh Rowe is available on his web site: www.josh.id.au ’ (Rowe, 2005)
2007	‘Domain names are fundamental and essential parts of the Internet's functionality. Australian domain names provide the platform for Australia's \$40 billion online economy. Josh Rowe is a current director of auDA seeking re-election. Josh Rowe has over 15 years experience with the Internet. Josh is an active participant in the debate of Australian and global domain name governance. Josh is a staunch consumer advocate within the Australian domain name industry especially in regards to exposing unscrupulous operators; www.domainwatch.org . Josh maintains www.whatsinaname.com.au which provides a Price Comparison of auDA Accredited Registrars. More information about Josh Rowe is available here: www.josh.id.au ’ (Rowe, 2007a)

4.13 Internet Corporation for Assigned Names and Numbers (ICANN)

Other researchers (Mueller, Mathiason & McKnight, 2004; Williams, 2003b) have dissected the formation of ICANN, together with its past and current activities. For this narrative piece, I will provide insights into my interactions with ICANN that are relevant to this study.

In March 2001, Melbourne hosted an ICANN meeting. I pre-registered for the meetings with all intentions to attend (ICANN, 2001b). However, personal priorities prevented me from doing so. In hindsight, I wish I had been able to attend the ICANN Melbourne meetings, as it was the face-to-face interactions at these meetings which reveal the true ICANN culture. auDA held a public forum at the same time as the ICANN meetings were on in Melbourne (auDA, 2001). Debate at the public forum centred on competitive models for the Australian domain name marketplace, and domain name policy changes. Both of these aspects were being considered by auDA policy panels at the time (auDA, 2000a) (auDA, 2000b).

It was not until March 2003, that I attended my first ‘in person’ attendance at an ICANN meeting in Rio de Janeiro, Brazil (ICANN, 2003). I attended most of the country code top-level domain (ccTLD) meetings with Chris Disspain (auDA CEO), Kim Davies (an Australian who was working for CENTR at the time) and the AusRegistry management team (Simon Delzoppo, Adrian Kinderis and Chris Wright). Tom Dale and Paul Szyndler attended on behalf of the Australian Government agency NOIE, and attended the Governmental Advisory Committee (GAC) meetings.

At this stage the ccTLD meetings were not formally part of the ICANN meetings, but happened to occur at the same date, time and venue as the ICANN meetings. There was lengthy discussion about a new ICANN structure called the Country Code Names Supporting Organisation (ccNSO) and a subsequent resolution that the ccNSO ‘would be designed as a forum to agree views of ccTLD managers and to act as a central vehicle for developing policy and best practice that is applicable on a global level’ (Country Code Top Level Domain Managers, 2003, p. 1). The same resolution went on to say that ‘ccTLDs reiterated their view that any global policy role for the ccNSO or ICANN is very limited in scope, and the majority of policies are matters of local concern’; a political statement which sought to keep domain name policy development in sovereign hands (Country Code Top Level Domain Managers, 2003, p. 1).

The ccTLD meetings had a handful of vocal members whose sole aim seemed to be to derail or slow down the process. I suspect that their interest was to stall any new policy changes that could stifle their personal commercial gain. However, their comments did not readily reveal their motives to the untrained ear.

For the main ICANN meetings, I attended a session on International Domain Names (IDNs), the public forum and board meeting. The board farewelled a teary Stuart Lynn and welcomed another Australian into the ICANN organisation – Paul Twomey. Karl Auerbach, a serious ICANN critic and ICANN board member, was in fine form, refusing to show appreciation for a departing ICANN employee.

A number of the auDA board members attended the 2006 New Zealand ICANN meetings (ICANN, 2006). The ccNSO had now been officially formed, with auDA CEO Chris Disspain, as the Chair. I attended the sessions that related ccTLD operators, including a familiar presentation from Nominet regarding Australian domain name slammers (Taylor, 2006). As this is an ethnographic recollection, I considered it appropriate to include a visual record from the field. The photograph in Figure 7 was taken at the 2006 ICANN New Zealand meeting, and depicts me together with Vint Cerf, ‘the father of the Internet’ (Schwartz, 1999) and Chris Disspain, Chief Executive Officer of .au Domain Administration Ltd.

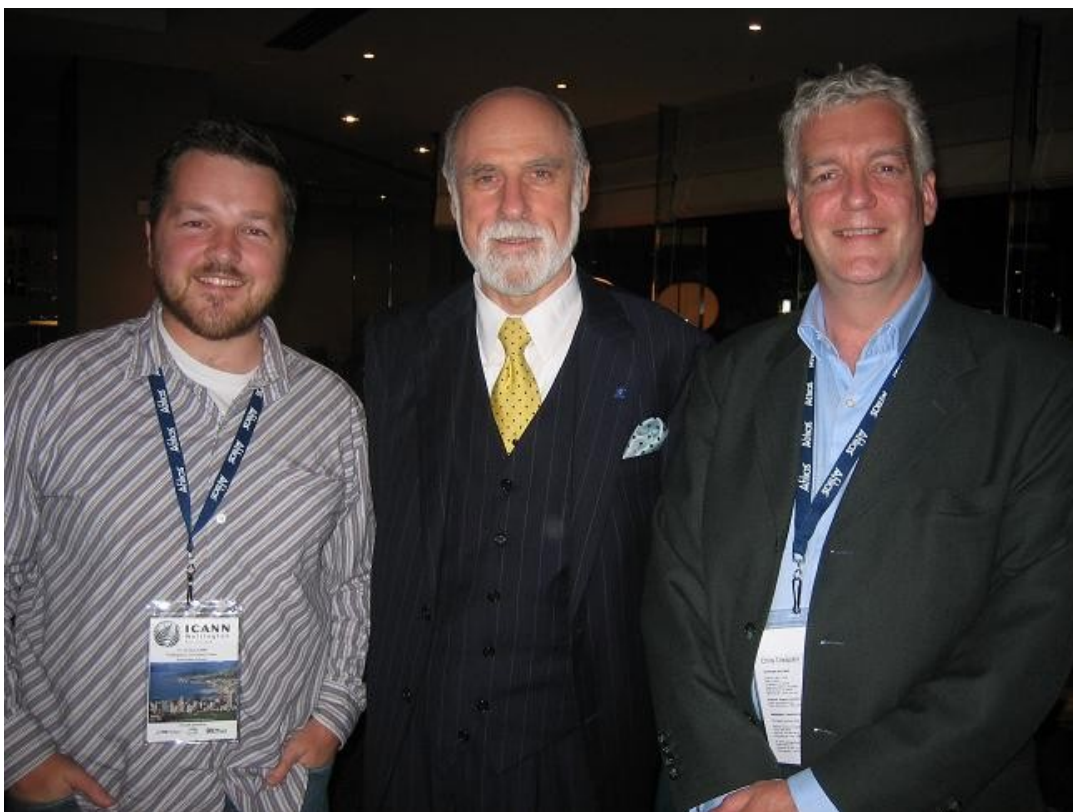


Figure 7: Photograph of me (left), Vint Cerf (middle) and Chris Disspain (right) at the 2006 ICANN Meeting in New Zealand

4.14 One million .au domains

On November 30, 2007, the one millionth .au domain name was registered (auDA, 2007f). This is in contrast to approximately the 34,000 .au domain names which existed in 1997. Table 25 contrasts key indicators in 1997 and 2007 for the Australian domain name industry.

Table 25: Australian domain name industry comparisons between 1997 and 2007

	1997	2007
End Users	16% of Australian households with Internet access (Australian Bureau of Statistics, 2007) 0.5% of world population with Internet access (Rowe, 1996; Central Intelligence Agency, 1997)	64% of Australian households with Internet access (Australian Bureau of Statistics, 2007) 21% of world population with Internet access (Miniwatts Marketing Group, 2008)
Registrants	34,000 .au domain names (Arnold, 2007b)	1,000,000 .au domain names (auDA, 2007f)
Registrars	5 Registrars (Healey, 1998). <ul style="list-style-type: none"> • Melbourne IT - com.au • Geoff Huston - gov.au, edu.au, info.au; • Connect.com.au/Hugh Irvine - net.au; and • Michael Malone - asn.au • Robert Elz - org.au, id.au. 	25 Registrars (auDA, 2008d) <ul style="list-style-type: none"> • Competitive marketplace (Rowe, 2007b) - asn.au, com.au, net.au, id.au, org.au; • Specialised registrars (auDA, 2008b) - edu.au, gov.au, csiro.au; and • Community geographic domains (auDA, 2008b) - act.au, nsw.au, nt.au, qld.au, sa.au, tas.au, vic.au, wa.au.
Registry	Robert Elz; <ul style="list-style-type: none"> • Academic supported registry system (Williams, 2003b) 	AusRegistry Pty Ltd; <ul style="list-style-type: none"> • Contracted provider of commercial registry system (AusRegistry, 2008)

	1997	2007
Regulator	Robert Elz; <ul style="list-style-type: none"> • 1 volunteer (Williams, 2003b) 	.au Domain Administration; <ul style="list-style-type: none"> • Government and Industry Supported (auDA, 2000e) \$4 M budget (auDA, 2007d), 6 staff (auDA, 2008g) Policy development process (auDA, 2008f) Dispute resolution process (auDA, 2008a)

4.15 Concluding remarks

This narrative is not intended to provide an exhaustive recollection of all of my interactions in the .au domain name industry. However, I have attempted to restrict the narrative to those areas which relate to the research questions.

First, the research question ‘*What is the structure of the domain name industry?*’ was addressed by describing the evolution of the Australian domain name industry, within the context of the international domain name industry. Second, the research question *How is domain name policy formed?* was addressed by providing firsthand account of the .au domain name policy development process, as well as a view of policy formation through the ICANN process.

This provides an appropriate segue to the next chapter, which presents a revised version of a submission I made to an .au domain name policy advisory panel; the latest happening inside the Australian domain name industry. This provides a practical example of how end users’ needs are brought to the attention of domain name policy makers.

5. Australia registers more .au than .com domains

‘The choice between a flat or hierarchical namespace in .au could be considered a religious argument with no compelling right or wrong answer’ – Kim Davies (2006)

5.1 Introduction

Debate on whether the .au domain name space should be open to direct registrations has been largely subjective and emotive on both sides (Rowe, et al., 2006). Relevant parties have been encouraged to present arguments based on empirical evidence – without success (Rowe & Lynch, 2006b).

This chapter is a revised version of a submission written in response to the auDA 2007 Names Policy Panel (auDA, 2007a) issues paper (auDA 2007 Names Policy Panel, 2007b). Only one issue from the issues paper; *‘Should .au be opened up to direct registrations (eg. domainname.au)?’* was explored (auDA 2007 Names Policy Panel, 2007b, p. 1).

5.2 Research approach and chapter structure

The research approach for this study is to use empirical evidence (where available) in relation to the opening up .au to direct registrations.

Each argument from the issues paper is addressed in turn (section 7.8 and 7.9). Arguments in favour and against direct registrations are quoted verbatim in boxes. Arguments which contain multiple points are numbered following the box. This is followed by an analysis of the issues and empirical evidence within the current literature.

5.3 Arguments for opening up .au to direct registrations

7.8 (point 1) Domain names under .au would be shorter and arguably more memorable, ie. domainname.au instead of domainname.com.au. This might have the effect of encouraging Australian entities who have registered their domain name in .com to register in .au. From a user perspective, there would be four fewer characters for people to type.

1. Domain names under .au would be shorter and arguably more memorable.

Burton (2007) asserts that usable domain names are not only short, but are also

- guessable
- easy to spell
- easy to type

- easy to say and pronounce
- memorable
- meaningful to customers
- meaningful to web site partners
- meaningful in the intended language
- run together without punctuation (if compound words)

Giant Games Ltd (2007) adds that the first rule in selecting a domain name is:

- choosing the right suffix (organisation type/country code)

Designating the .au domain name space as a ‘design’, according to Nielsen’s (2003) definition of usability, provides the following guidelines:

- Learnability: How easy is it for users to accomplish basic tasks the first time they encounter the domain name space
- Efficiency: Once users have learned the domain name space, how quickly can they perform tasks?
- Memorability: When users return to the domain name space after a period of not using it, how easily can they re-establish proficiency?
- Errors: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?
- Satisfaction: How pleasant is it to use the domain name space?

Implied by Design (2006) points out that a memorable domain name does not necessarily have to be short. They illustrate this point with an example. Which of the following two domain names would you be more likely to recall: BobJonesSurfShop.com or BJSShop.com? One is potentially faster to type, but the full business name is definitely more memorable as a domain name.

Existing registrants may wish to register their equivalent .au third level domain (3LD) name directly under .au. Consider the example, using actual domain name registrants, in Table 26. Australian Creative Music Educators (acme.org.au) hypothetically secures a shorter domain name ‘acme.au’, however, the three other registrants, all in search of memorable domain names, hypothetically, end up with longer domain names.

Table 26: Example of securing a memorable .au domain name

Domain	Registrant	Registration Example	Shorter
acme.com.au	ACME Digital	AcmeDigital.au	✗
acme.id.au	Alex Walker Anderson	AcmeAlex.au	✗
acme.net.au	Acme Pacific Exchange	AcmeExchange.au	✗
acme.org.au	Australian Creative Music Educators	Acme.au	✓

2. This might have the effect of encouraging Australian entities who have registered their domain name in .com to register in .au.

Allowing direct registrations for a ccTLD does not necessarily mean that others will register a ccTLD domain over a .com domain. Table 27 shows the ccTLD to .com domain name ratio for the ten countries who register the most .com domain names.

The most ‘patriotic’ ccTLD is Germany, which offers direct registrations, followed by the United Kingdom, which does not offer direct registrations. Both register more ccTLD domains than .com domains.

Table 27: ccTLD to .com ratio for top ten countries who register the most .com domain names

Country	.com domains (WebHosting.info, 2007a) (WebHosting.info, 2007a)	ccTLD	ccTLD domains	Direct Registrations Allowed	ccTLD / .com ratio (%)
Germany	2,842,755	.de	10,993,310 (DENIC, 2007)	✓	387
United Kingdom	2,249,345	.uk	5,962,232 (Nominet, 2007)	✗	265

Country	.com domains (WebHosting.info, 2007a) (WebHosting.info, 2007a)	ccTLD	ccTLD domains	Direct Registrations Allowed	ccTLD / .com ratio (%)
Japan	715,725	.jp	925,242 (Japan Registry Services, 2007)	✓	129
China	1,983,920	.cn	1,874,604 (China Internet Network Infomation Center, 2007)	✓	94
Spain	706,025	.es	568,085 (ESNIC, 2007)	✓	80
Australia	1,302,101	.au	898,107 (AusRegistry, 2007b)	✗	69
France	1,284,821	.fr	840,079 (AFNIC, 2007)	✓	65
Canada	2,016,277	.ca	849,570 (CIRA, 2007)	✓	42
Hong Kong	1,465,852	.hk	138,952 (HKDNR, 2007)	✓	9
United States	39,073,918	.us	1,246,567 (Name Intelligence, 2007)	✓	3

The Australian .com domains statistics are skewed by a massive domain portfolio held by an Australian ‘direct navigation’ company; Dark Blue Sea Pty Ltd. Direct navigation, also known as type-in traffic, results from users typing in domain names directly into a web browser’s address bar, bypassing search engines. Dark Blue Sea Ltd (2006) has a domain name portfolio of 545,000 – the world’s second largest portfolio of domain names (Skeen, 2007). By removing their .com domains from the comparison above, Australia’s ccTLD to .com domain ratio would increase to above 100%.

In other words, Australia registers more .au than .com domains.

Irrespective of the ccTLD hierarchical structure, Mueller (2004, p. 25) claims that countries which impose policy restrictions on ccTLD domain registrations have a much higher proportion of domain name registrants who register .com domains. France is known for their highly restrictive ccTLD domain policies, with more .com domain registered than .fr domain names. Alternatively, Germany and the United Kingdom, with more accommodating policies, have outstripped the French ccTLD in number of registrations, and have fewer .com domain registrations.

Further research could be conducted on the effect of domain name policy and price to understand domain name registrants’ buying preferences.

3. From a user perspective, there would be four fewer characters for people to type.

There is no clear evidence as to what the benefit of typing four fewer characters is for users; a reduction in repetitive strain injury or a longer life for keyboards perhaps?

7.8 (point 2) .au domain names would more readily and effectively identify the registrant as Australian (compared with com.au, org.au etc), showcasing Australian businesses and brands more effectively in the global market.

What brand value do the current Australian 2LDs (com.au, org.au, edu.au, gov.au, etc) possess compared with the potential brand value of .au for both the domestic and global markets?

Tonkin (2006, p. 8) asserts that ‘*there would be a significant cost to businesses to try to protect their brands in the top-level without any specific gain from a consumer perspective*’. Whilst Bloch (2006, p. 8) contends direct registrations under .au are a ‘*vital requirement ... in a globalising economy and Australia is a brand in that economy*’. However, according to Arnold (2007d), there is a paucity of empirical research on domain name branding.

Further research could be conducted to establish the current value of the Australian 2LD brands, compared with the potential value of the .au brand, for both the domestic and global markets.

7.8 (point 3) Assuming direct registrations only was adopted (this would mean that people would only be able to register a domain name directly under .au, and the 2LD hierarchy would be deactivated). A ‘flat’ structure would be much simpler to understand and navigate than a hierarchical structure, because users would not have to know and remember the different 2LDs and their meanings. This might make it easier for international users, who are more familiar with direct registrations in other TLDs, to navigate the .au domain.

1. A ‘flat’ structure would be much simpler to understand and navigate than a hierarchical structure, because users would not have to know and remember different 2LDs and their meanings.

Although he was not making a case for direct registrations under a ccTLD, Mueller (2004) claims that hierarchical domain name spaces increase the need for new categories which seem more meaningful or important.

Bulgaria offers direct registrations under .bg and in September 2006, introduced 36 seemingly meaningless 2LD domains, presented in Table 28 (Register.BG, 2006). These provide 37 separate domain name spaces for registrants to choose from. Examples of actual .bg registered domains include: pystore.bg, plasticsurgery.a.bg, and cosmos.1.bg. The introduction of these new spaces reveals two key points; firstly the 2LDs will not become less meaningful over time (since they start with no intended meaning) and secondly, there is a larger number ‘good’ domain names available for registration (for example acme.a.bg, acme.x.bg, acme.1.bg, etc).

Table 28: Bulgarian second level domain name hierarchy

.a.bg	.b.bg	.c.bg	.d.bg	.e.bg	.f.bg
.g.bg	.h.bg	.i.bg	.j.bg	.k.bg	.l.bg
.m.bg	.n.bg	.o.bg	.p.bg	.q.bg	.r.bg
.s.bg	.t.bg	.u.bg	.v.bg	.w.bg	.x.bg
.y.bg	.z.bg	.0.bg	.1.bg	.2.bg	.3.bg
.4.bg	.5.bg	.6.bg	.7.bg	.8.bg	.9.bg

Further research should be conducted to determine if international users find hierarchical ccTLD structures difficult to navigate.

2. A ‘flat’ structure might make it easier for international users, who are more familiar with direct registrations in other TLDs, to navigate the .au domain.

This argument assumes that international users are more familiar with direct registrations. Of the 250 ccTLD domain name spaces, 73% have second level structures, demonstrating that many international users would in fact be more familiar with second level structures than ‘flat’ structures.

Furthermore, for the country codes which offer registrations under a second level hierarchy, the most common second level names (that is, the ‘com’ in ‘com.au’, the ‘org’ in ‘org.uk’ or the ‘ac’ in ‘ac.nz’) are presented in Figure 8. Russia’s ‘.ru’ country code top-level domain features the largest second level hierarchy, with 133 entries from ‘ac.ru’ through to ‘zgrad.ru’. Figure 9 shows country code domains with large second level hierarchies.

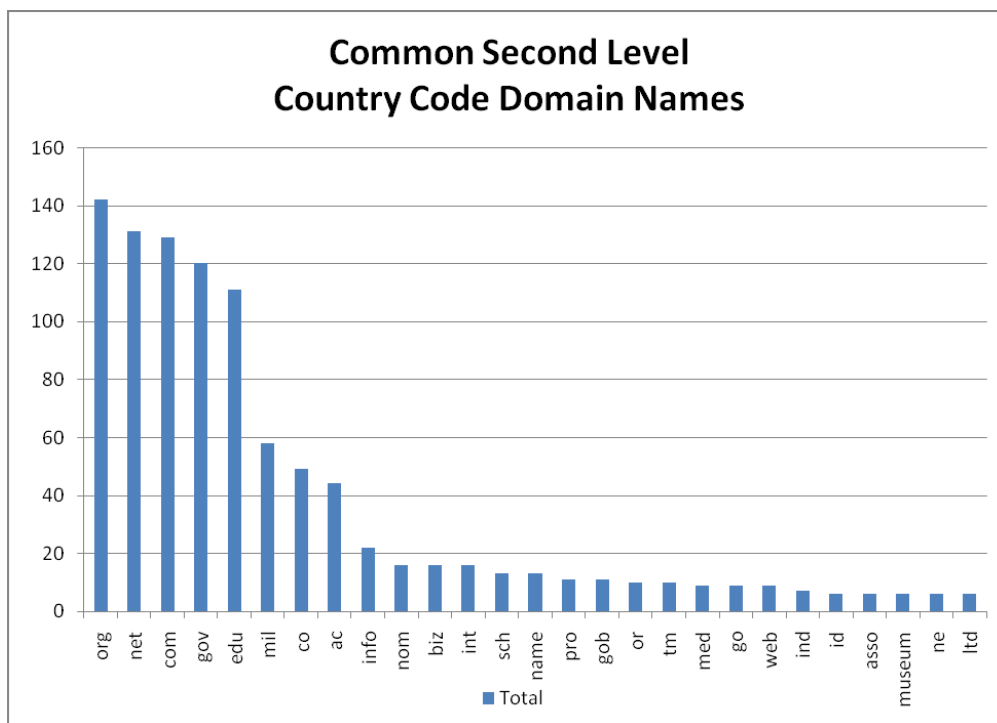


Figure 8: Common second level country code domain names

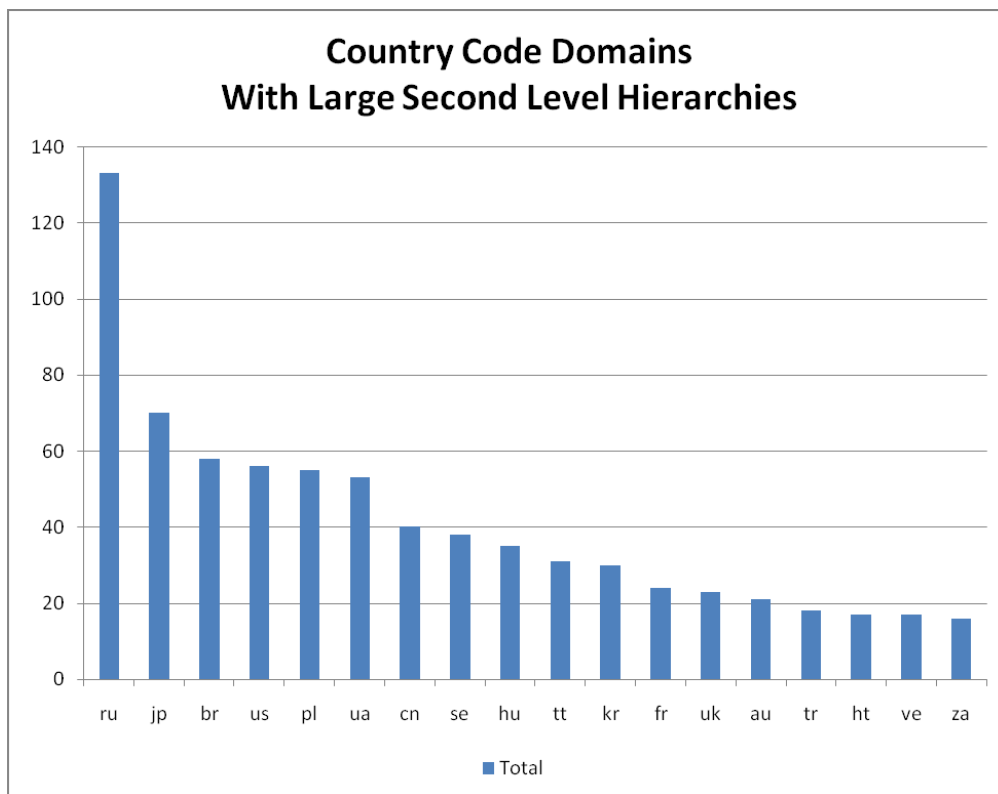


Figure 9: Country code domains with large second level hierarchies

What is the current mix of Australian versus international users who visit .au sites? Potentially more challenging to ascertain; what is the preferred mix?

Further research could be conducted to determine if international users are more familiar with ‘flat’ structures.

7.8 (point 4) Assuming a combination of direct registrations and 2LD hierarchy was adopted (this would mean that the current 2LD hierarchy would be retained, and people could choose whether to register in a 2LD or directly under .au.). There would be more choice for registrants to register their domain name directly under .au or under one of the 2LDs (or both). It may also enable new registrants to have access to desirable and valuable domain names that have already been taken in the 2LDs.

1. There would be more choice for registrants to register their domain name directly under .au or under one of the 2LDs (or both).

Allowing direct registrations under .au will offer more domain name space. However, the choice of domain names will depend on what is available, which in turn depends on the method used to introduce direct registrations.

The auDA 2007 Names Policy Panel (2007b) explored a range of methods for introducing direct registrations. These are provided in Table 29, together with the researcher’s considerations for each method.

Table 29: Examples of methods to introduce direct registrations and considerations

Method	Considerations
Giving trade mark holders a ‘sunrise’ period in which to secure registration of their trade mark domain names.	<p>The current .au Domain Name Eligibility and Allocation Policy Rules for the Open 2LDs (auDA, 2005, p. 1) decree that ‘there is no hierarchy of rights in the DNS. For example, a registered trade mark does not confer any better entitlement to a domain name than a registered business name’.</p> <p>Further, while trademarks are one accepted form of eligibility criteria for the asn.au, com.au, net.au, and org.au 2LDs, they are not a requirement for id.au, gov.au (Department of Finance and Deregulation, 2007) or edu.au (Education.au, 2007) 2LDs.</p>
Giving existing com.au registrants the first right of refusal over the corresponding .au domain name	On what basis would com.au registrants receive priority over asn.au, net.au, id.au, org.au, edu.au, and gov.au registrants?
Implementing a special dispute resolution process for conflicts between existing 2LD hierarchy registrants	On what basis would disputes be resolved for 2LD hierarchy domains, given that their eligibility criteria are not uniform?
Reserving certain names from registration for a period of time.	<p>Would all existing 3LD names be reserved?</p> <p>If so, a process for managing conflicts would need to be developed (refer to consideration above).</p>

2. It may enable new registrants to have access to desirable and valuable domain names that have already been taken in the 2LDs.

A survey (Zittrain & Edelman, 2002) of the usage of the .biz TLD found that 25% of .biz domains were likely to have been registered by the same organisation that held the corresponding .com domain name. However, this may not be a useful comparison as ‘com.au/org.au/gov.au/etc’ and ‘.au’ has a stronger semantic affinity than ‘.com’ and ‘.biz’ does.

Further research could be carried out on those ccTLDs that have introduced direct registrations, to establish what proportion of existing 3LD registrants registered their name directly under the ccTLD.

7.8 (point 5) There would be a commercial gain for the Australian domain name industry; the registry operator, registrars and resellers could expect to generate more revenue from increased numbers of registrations. Under auDA’s registry competition policy, a new operator may be selected to run the .au registry, potentially leading to lower costs and more choice for registrars.

One of the auDA 2007 Names Policy Panel’s policy objectives is to support the Australian online economy; valued at \$40 billion (Australian Bureau of Statistics, 2006) for 2004/2005.

The .au domain name industry is worth approximately \$45 million per annum or 0.1% of Australian online economy. This estimation is based on an average price for .au domain names (Rowe, 2007b) of \$50 per annum and 900,000 .au domain name registrations.

Further research could be conducted to determine whether opening up .au to direct registrations could stimulate growth in the other 99.9% of the Australian online economy.

7.8 (point 6) Other ccTLDs (examples include Austria .at, China .cn, Japan .jp, Korea .kr, Singapore .sg) have managed the transition to direct registrations successfully, and their experience shows that there is strong consumer demand once direct registrations become available.

1. Other ccTLDs have managed the transition to direct registrations successfully.

How was successful transition measured for the examples above?

Have other ccTLDs failed, or been challenged, in transitioning to direct registrations? If so, why were they unsuccessful?

The measures required for a successful .au transition could relate directly to the panel objectives, as presented in Table 30.

Table 30: Potential success measures for transition to direction registrations

Objective	Potential Success Measures
To maintain the Australian identity of the .au domain space.	High proportion of .au registrants with an association or nexus with Australia.
To enhance the usability of the .au domain space.	<p>Using Nielsen’s (2003) definition of usability:</p> <p>Learnability: How easy is it for users to accomplish basic tasks the first time they encounter the domain name space</p> <p>Efficiency: Once users have learned the domain name space, how quickly can they perform tasks?</p> <p>Memorability: When users return to the domain name space after a period of not using it, how easily can they re-establish proficiency?</p> <p>Errors: How many errors do users make, how severe are these errors, and how easily can they recover from the errors?</p> <p>Satisfaction: How pleasant is it to use the domain name space?</p>
3. To preserve the integrity of the .au domain space.	<p>Low occurrence of disputes.</p> <p>Low occurrence of cyber squatting.</p> <p>Low occurrence of scams.</p> <p>High protection of rights holders.</p>
4. To facilitate economic benefits flowing from the .au domain space.	Demonstrable link between the opening up of .au and an increase in value of the Australian online economy above an increase in the number of .au domain name registrations.

2. Other ccTLDs shows that there is strong consumer demand once direct registrations become available.

Austria introduced direct registrations at the beginning of 1999, when registrations totalled 29,186 (nic.at, 2007). At the end of 2006, there were 709,003 Austrian domain names registered, with 96.2% of registrations directly under the .at domain.

Figure 10 illustrates the growth of Chinese domain name registrations. China added direct registrations under .cn to their hierarchical structure in February 2003. Within 9 months, registrations for .cn domain names surpassed com.cn domain names (CNNIC, 2007). In February, 2007, .cn domain names made up 62%, compared with 27% of com.cn domain names. The com.cn domain name space has continued to grow since the introduction of direct registrations under .cn, albeit at a slower rate. The steeper growth rate from 2005 onwards is attributed to the opening up of .cn domain name registrations to registrars outside of China (CNNIC, 2005).

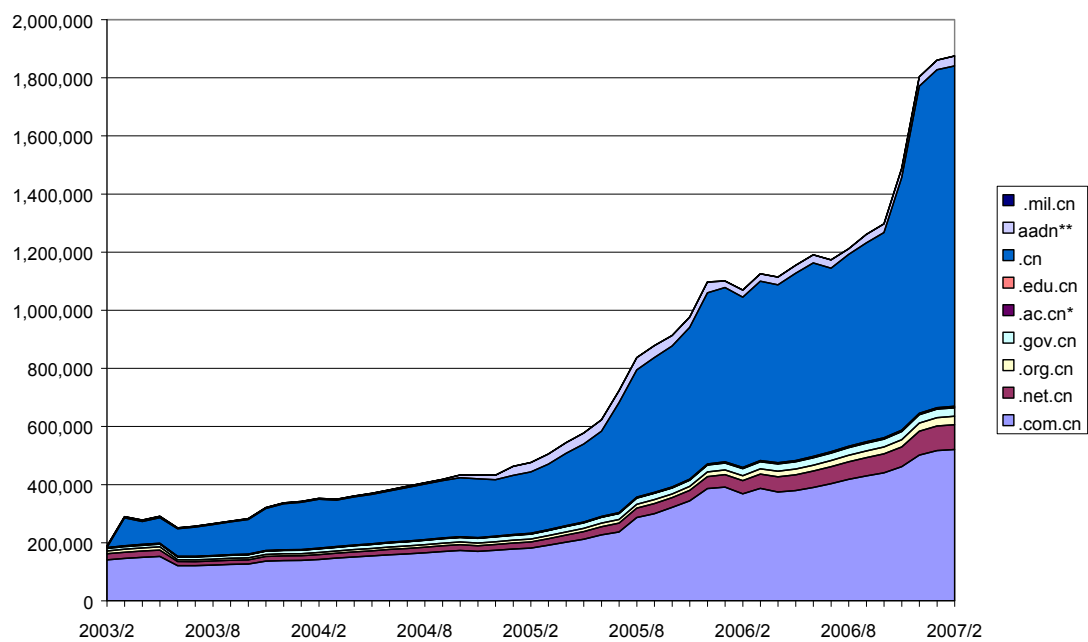


Figure 10: Growth of Chinese domain name registrations

5.4 Arguments against opening up .au to direct registrations

7.9 (point 1) The existing 2LD hierarchy works well and there is high market recognition of the com.au and org.au brands especially. There are approximately 860,000 3LD .au domain names (refer to .au registry reports at <http://www.auda.org.au/ausregistry/reports/>) compared with over 65 million .com domain names (refer to daily domain count statistics at <http://www.domaintools.com/internet-statistics/>), indicating that the existing 2LDs are not exhausted in terms of desirable and valuable domain names.

New Zealand sought submissions on the possibility of opening up .nz to direct registrations and concluded (New Zealand Domain Name Commission, 2006) that domain names may only be registered in the third level of the .nz domain name space. Concerns raised (New Zealand Domain Name Commission, 2004) during the review included:

- Unnecessary complication for / impact on existing registrants.
- Pressure for large-scale duplication, and conflict over 2LD names.
- Potential abuse by 2LD registrants offering registrations at the third level.
- Resource implications in managing any change.
- Legal risks for InternetNZ in making such a change.
- Conflicts over who has the right to the 2LD version of existing 3LD names.

1. The existing 2LD hierarchy works well.

Criteria which indicate that a 2LD hierarchy ‘works well’ include:

- maintaining the Australian identity of the .au domain space;
- enhancing the usability of the .au domain space;
- preserving the integrity of the .au domain space; and
- facilitating economic benefits flowing from the .au domain space.

Usability is one of the key benefits of the existing 2LD hierarchy, according to Melbourne IT (2007), who hold that the structure provides an indication to the user of the nature of the domain name registrant. For example: flinders.edu.au is a university whilst flinders.com.au is a commercial business.

Further research could be conducted to determine what other evidentiary measures prove that the 2LD hierarchy ‘works well’.

2. There is high market recognition of the com.au and org.au brands especially

Further research could be conducted to establish the market recognition of the Australian 2LD brands, contrasted against the potential recognition of the .au brand for both the domestic and global markets.

3. The existing 2LD hierarchy domains are not exhausted in terms of desirable and valuable domain names.

The case could also be made that there are another 64,140,000 viable domain names available directly under .au, just to catch up with the number of .com domain names registered.

7.9 (point 2) Unlike new TLDs, this is not a green fields scenario and the rights and expectations of existing registrants should not be discounted. Existing 3LD domain names may be devalued if .au is opened up to direct registrations and existing 3LD registrants may be forced into defensive registration or legal action to protect their brands.

1. Existing 3LD domain names may be devalued if .au is opened up to direct registrations.

If the existing 2LD hierarchy is retained, there is a risk that similar domain names could be registered directly under .au, to trade off existing 2LD domain name registrants’ brands by capturing mistyped domain names. Electronic Frontiers Australia (2006) asserts the proposed change would invite fraudulent use of phoney 2LDs in the format ‘national.conn.au’. Table 31 presents some possible examples.

Table 31: Examples of possible ‘Phoney’ .au 2LD hierarchies

Existing 2LD hierarchy	Possible ‘Phoney’ 2LD hierarchies
asn.au	assn.au, ass.au
com.au	con.au, cm.au, comm.au, co.au, corp.au, ltd.au, ptlyltd.au
edu.au	uni.au, school.au, tafe.au, education.au
gov.au	govt.au, gv.au, government.au
id.au	me.au, name.au
net.au	ne.au, et.au, not.au
org.au	or.au, charity.au

A Canadian entrepreneur has struck a deal (Richards, 2007) with the country of Cameroon (.cm) to redirect mistyped .com domains names to an advertising page. Under the deal any request for an unregistered .cm site will default to an advertising page – as opposed to the company who happens to own the .com domain name. The entrepreneur is said to be negotiating similar deals with Colombia (.co) and Oman (.om) which could be confused with ‘.com’, as well as Niger (.ne) and Ethiopia (.et) which could be confused with ‘.net’.

2. Existing 3LD registrants may be forced into defensive registration or legal action to protect their brands.

Henley-Calvert (2007) draws attention to one instance where four different organisations have identical domain names under different .au 2LDs, as presented in Table 32. He then argues that any move to direct registrations under .au would cause conflict between these four organisations for the rights to the psa.au domain name.

Table 32: Example of different organisations using an identical name under different .au 2LDs

Domain	Organisation
psa.asn.au	Public Service Association
psa.com.au	Polystyrene Australia Pty Ltd
psa.net.au	Print Solutions Australia
psa.org.au	Pharmaceutical Society of Australia

Similarly, five organisations share the same name ‘heritage’ under various .au 2LD hierarchy domain names presented in Table 33. In light of this, the question becomes, ‘how are the competing rights for heritage.au best evaluated?’.

Table 33: Another example of different organisations using an identical name under different .au 2LDs

Domain	Organisation
heritage.com.au	Heritage Seeds
heritage.edu.au	Heritage College
heritage.gov.au	Department of the Environment and Heritage
heritage.net.au	Heritage Business Systems
heritage.org.au	Scottish Heritage (Qld)

Further research could be undertaken to quantify exactly how many 3LD domain names would conflict if registered directly under .au.

7.9 (point 3) Registrants who choose, or feel compelled, to switch from a 3LD to a direct registration may face significant costs, such as domain name registration fees, printing and stationery, signage, marketing and advertising, as well as revenue already spent promoting the current brand.

The auDA 2007 Names Policy Panel (2007b) sets out two options for implementing direction registrations under .au. The first option would allow direct registrations only, deactivating the 2LD hierarchy, following a transition period. The second option would allow direct registrations, whilst retaining the existing 2LD hierarchy.

The first option would compel registrants to relinquish their 3LD domain name, at which point they could choose to register either directly under .au, or another domain name space altogether. The second option would allow registrants to retain their 3LD domain name and register directly under .au domain.

Costs for switching domain names fit into two main categories:

- Marketing – for example advertising (outlets, billboards, radio, television, transport fleets, etc), stationary (letterheads, business cards, etc), search engine optimisation, web site design, etc; and
- Information Technology – for example: web site systems, email systems, customer relationship management systems, etc.

The magnitude of the costs associated with changing a domain name will vary with the type and size of the domain name registrant. For example, an individual switching from joebloggs.id.au to joebloggs.au may have negligible costs associated with changing web site/email systems and advising new contact details. However, a corporation switching from corporate.com.au to corporate.au could face substantial costs associated with both marketing and information technology changes.

Further research could be conducted to quantify the types and magnitudes of potential costs for switching domain names for representative groups of registrants.

7.9 (point 4) Introducing direct registrations may lead to increased disputes about rights to a domain name. Regardless of the implementation method, ultimately only one entity can secure the .au version of a domain name, which is particularly problematic where the same domain name is held by different registrants in different 2LDs.

The World Intellectual Property Organization (2007) provides statistics by country on domain name arbitrations it has undertaken. It has not been established if these statistics are solely for ccTLDs disputes, or if they include gTLD disputes as well.

Further research could be conducted to determine if the number of disputes has increased for ccTLDs that have switched to direct registrations.

7.9 (point 5) Regardless of which implementation option is adopted, introducing direct registrations is likely to cause user confusion, at least in the short to medium term. User confusion and unfamiliarity with the new domain names may lead to an increased risk of phishing and scams similar to the misleading renewal notices that occurred in Australia during 2003-04.

According to Davies (2003), the conditions under which .au domain name scams (Rowe, 2006a) thrived included:

- no formal regulator;
- Internet boom; and
- the marketing database was available for all to download.

The current conditions are:

- established regulator (auDA, 2008c) prepared to take scammers to court (auDA, 2004);
- agreed industry code of practice (auDA, 2006);
- formal complaints handling process (auDA, 2007e); and
- increasing awareness of auDA (Flash Advertising, 2006).

Further research could be conducted to determine if scams increased for ccTLDs which have switched to direction registrations.

7.9 (point 6) Assuming direct registrations only was adopted (this would mean that people would only be able to register a domain name directly under .au, and the 2LD hierarchy would be deactivated). Direct registrations would reduce the size of the available namespace as well as the branding choice for registrants, because they would not be able to differentiate themselves as commercial (com.au) or not-for-profit (org.au).

1. Direct registrations would reduce the size of the available namespace.

The .com domain space has almost 68 million domains (WebHosting.info, 2007b) (WebHosting.info, 2007b) under one top-level domain. The .au space has about 900,000 domains (AusRegistry, 2007a) under multiple 2LDs. The .au domain space is 1.3% of the size of the .com domain space, so there is ample room for growth in .au direct registrations.

2. Direct registrations would reduce the branding choice for registrants, because they would not be able to differentiate themselves as commercial (com.au) or not-for-profit (org.au).

This argument is addressed in section 7.9 (point 1).

7.9 (point 7) Increased commercial opportunities and revenue for the Australian domain name industry is not in itself a sufficient business case for making a change, in the absence of any clear benefit for the broader community.

This argument is addressed in section 7.8 (point 5).

7.9 (point 8) Experience with new TLDs, most recently .eu, suggests there would be a high risk of implementation problems and people trying to game the system (for example, refer to www.euridsucks.eu). Any special protective rules or procedures would have a high overhead, with the likelihood that costs would be passed onto consumers.

1. There would be a high risk of implementation problems and people trying to game the system.

Parsons (2006) alleged that Eurid allowed 400 ‘phantom’ registrars to access the .eu registry, allowing them to secure the ‘really valuable names’.

Further research could be conducted to determine if ccTLDs direct registration transitions have been ‘gamed’.

2. Any special protective rules or procedures would have a high overhead, with the likelihood that costs would be passed onto consumers.

Further research could be conducted to seek evidence to determine if ccTLDs costs increased as a result of direct registration transitions.

5.5 Concluding remarks

This chapter provided empirical data (where available) in response to the question ‘Should .au be opened up to direct registrations (eg. domainname.au)?’.

The submission did not attempt to provide weightings or priorities for each argument; which was the task for the auDA 2007 Names Policy Panel and auDA board.

The auDA 2007 Names Policy Panel final report came to the view that ‘there was no groundswell of support among the general community for opening up .au to direct registrations, and even amongst those in favour of direct registrations, there is little likelihood of agreement on a method for implementation. For these reasons, the Panel agreed to recommend that .au should not be opened up to direct registrations at this time’ (auDA 2007 Names Policy Panel, 2007a, p. 4).

The auDA board endorsed the Panel’s recommendation that the .au domain name space should not be opened up to direct registrations at this time (auDA, 2007b).

6. Improving Internet usability

6.1 Introduction

The purpose of this study was to develop a set of criteria for policy makers to evaluate domain name policies, with the specific aim of improving the usability of domain names for end users. In order to address the research objective, the main research question posed was *'What are the criteria for an effective domain name policy?'*

The study has demonstrated that domain name policies worldwide vary considerably between, and sometimes even within, countries. As a consequence, end users are inconvenienced by contradictory domain name policies, which diminish the predictability of an entity's domain name, decreasing usability for end users. The effect of poor usability is decreased productivity, sales, revenues and customer satisfaction, as well as increased training and support costs, development time and costs, and maintenance costs (Usability Professionals' Association, 2008).

One technique for improving Internet usability is the creation of a set of criteria with which domain name policy makers can evaluate domain name policies to improve the usability of domain names for end users. This research has addressed these issues by treating the domain name system as a user interface for the Internet. This vital user interface requires the understanding of end users to be readily usable. The implications of this research for end users will be explored throughout this chapter.

This chapter provides a set of criteria which can be used to evaluate domain name policy in terms of its effectiveness for the end users of domain names.

6.2 A framework for domain name policy evaluation

Domain names are regulated by a combination of standards and policies (Postel, 1994). The distinction between the purposes of a policies and standards is essential to understand why there are inconsistencies among domain name policies. Influencing behaviour through policy alone does not lead to predictable results. Conversely, adherence to standards produces uniform actions, and in turn to expected outcomes (Alsaiyed, 2005).

Domain names are a user interface for the Internet. This new framework extends the current research that treats the domain name system as a user interface by proposing criteria which address usability and quality concerns. The framework sets out criteria which provide domain name policy makers with a means of critically assessing domain name policies with end users in mind. The framework has been designed in such a way that it can be extended to include new criteria if further research calls for such additions. The framework has the potential to set an international standard for the critical evaluation of domain name policy and to become the basis of further research.

Designating the domain name space as a ‘design’, according to Nielsen’s (2003, p. 1) definition of usability, provides the following usability quality attributes:

- Learnability: How easy it is for users to accomplish basic tasks the first time they encounter the domain name space;
- Efficiency: How quickly users can perform tasks once they have learned the domain name space;
- Memorability: How easily users can re-establish proficiency when they return to the domain name space after a period of not using it;
- Errors: How many errors users make, how severe the errors are, and how easily they recover from the errors; and
- Satisfaction: How pleasant it is to use the domain name space.

The domain name policy evaluation framework in Table 34 can be used to evaluate the domain name policy for any domain name space, regardless of which level it occupies in the overall domain name hierarchy. The same criteria can be usefully applied regardless of whether the domain name policy being evaluated is at the top-level (for example ‘.com’, ‘.au’, ‘.nz’) second level (for example ‘.com.au’, ‘.co.uk’), third level (for example ‘.rmit.edu.au’, ‘.vic.gov.au’) and so on (for example ‘.student.rmit.edu.au’, ‘.yallara.cs.rmit.edu.au’, etc).

Whilst this study has focused on Internet domain names, the domain name policy evaluation framework can also be usefully applied to internal or intranet domain names.

Table 34: Domain name policy evaluation framework

Criteria for domain name policy evaluation	Example(s)
<p>Who are the intended users for the domain name space?</p> <p><i>Consider end users of the domain name (not the domain name registrants).</i></p>	<p>The intended users for the Australian community geographic domain names (act.au, nsw.au, nt.au, qld.au, sa.au, tas.au, vic.au, wa.au) are listed as: All members of the Australian Community, Business and Industry, Local Community Groups/Organisations, Tourism – Local, State/Territory, National and International (One City One Site, 2002).</p>
<p>How is the domain name space meant to be interpreted by the intended users?</p>	<p>The ‘.com.au’ domain name space is for Australian commercial entities (auDA, 2005).</p>
<p>How else could the domain name space be interpreted by the intended users?</p>	<p>Italy’s ‘.it’ ccTLD (IANA, 2008a) can be interpreted as the abbreviation for ‘Information Technology’ or the English word ‘it’.</p>
<p>Who are the unintended users for the domain name space?</p> <p><i>Consider end users of the domain name (not the domain name registrants) who are not the intended users for the domain name space.</i></p>	<p>A Canadian entrepreneur has struck a deal with the country of Cameroon (.cm) to redirect mistyped .com domains names to an advertising page (Richards, 2007). Under the deal, any request for an unregistered .cm site will default to an advertising page – as opposed to the company who happens to own the .com domain name. The entrepreneur is said to be negotiating similar deals with Colombia (.co) and Oman (.om) which could be confused with ‘.com’, as well as Niger (.ne) and Ethiopia (.et) which could be confused with ‘.net’.</p>

Criteria for domain name policy evaluation	Example(s)
How could the domain name space be interpreted by the unintended users ?	The country names of Australia and Austria are sometimes confused (Mail Online, 2007). Similarly, a user not familiar with the domain name system could misinterpret ‘.au’ as the ccTLD for Austria instead of Australia.
Is the domain name space consistent compared with other domain name spaces for the intended or unintended users ?	Educational domain name spaces include ‘edu.au’, ‘ac.nz’ and ‘sch.uk’. For the 250 ccTLDs there are 111 ‘edu’, 44 ‘ac’ and 13 ‘sch’ second level domain names (Chan, 2008).
What other semantic meanings does the domain name space have for the intended or unintended users ?	VeriSign reportedly (Big Empire, 2007) pays the Pacific Island of Tuvalu \$2.2 million dollars per annum to operate the .tv domain; targeted at the TV and entertainment industry. Laos has handed over .la to the LA Names Corporation; who misinform their web site visitors that ‘.LA is the official internet address for Los Angeles’ (LA Names Corporation, 2008, p. 1) when the official ccTLD database says otherwise (IANA, 2008b). Cue Clothing turned to the Cocos (Keeling) Islands for a perfect semantic affinity between their company name and the .cc domain extension. Guernsey’s .gg ccTLD presents the obvious domain extension for horse betting companies.
How easy is the domain name space to spell for intended or unintended users ?	Users from the United States expect ‘center’ where as British users will expect ‘centre’ (Top Hoster Center, 2007).

Criteria for domain name policy evaluation	Example(s)
How easy is the domain name space to type for intended or unintended users ?	Consider the input device (for example United States layout keyboard, mobile phone keypad, etc) and the end user’s proficiency at using the input device. One entrepreneur recently auctioned 264 ‘circle shape’ .com domains using the standard QWERTY keyboard (Nottiger, 2008).
How easy is the domain name space to say and pronounce for intended or unintended users ?	The domain name space ‘naturbruksgymn.se’ may be simple to say for a Swede, but those from other countries may find it difficult to pronounce.
How memorable is the domain name space for intended or unintended users ?	A memorable domain name does not necessarily have to be short; consider which of the two domain names would more likely be recalled, BobJonesSurfShop.com or BJSShop.com (Implied by Design, 2006).
How meaningful is the domain name space in the languages and scripts of the intended or unintended users ?	‘.nu’ is the country code top-level domain for the Pacific Island of Niue (IANA, 2007). ‘Nu’ means ‘now’ in Swedish (Google Translate, 2008b) and ‘nude’ or ‘naked’ in French and Portuguese (Google Translate, 2008a).

6.3 Concluding remarks

This chapter provided the criteria for a framework for domain name policy evaluation. Domain name policy makers can apply the framework to evaluate domain name polices to improve the usability of domain names for end users. The benefits of improved usability include increased productivity, sales, revenues and customer satisfaction, as well as decreased training and support costs, development time and costs, and maintenance costs (Usability Professionals' Association, 2008).

The next chapter presents the main research findings and suggestions for further research.

7. Conclusion

7.1 Introduction

This chapter summarises and discusses the main research findings of this study, with respect to the current literature. It provides a set of criteria which can be used to evaluate domain name policy in terms of its effectiveness for the end users of domain names. The limitations of the study and potential areas for future research are also set out.

7.2 Main research findings

The literature review found that there is significant existing research in the separate research fields of domain names *and* usability (Bevan, 1999; Bradner, 1996; Dhamija, Tygar, & Hearst, 2006; Earthy, 1998; ISO, 1998; Lipton, 2005; Manheim & Solum, 2004; Mueller, 2004; Mueller, Mathiason & McKnight, 2004; Murphy & Scharl, 2007; Nielsen, 2003; Rimmer, 2003; Rood, 1999; von Arx & Hagen, 2002; Williams, 2003b; Yu, 2004). However, academic research at the intersection of the two topics – domain names and usability – is scarce. The research that does exist, in this somewhat new and untried field of study, describes domain names as part of the web user interface (Nielsen, 1999). This foundation concept formed the basis of this study. The evidence presented in this study concurs with Nielsen's (1999) research and extends it into the new field of *domain name usability* – a previously untested field of study.

The researcher has established that the predictability, and henceforth usability, of domain names rely on effective domain name policy. The importance of effective domain name policy is evident through the non-standardised and delegated process of domain name policy development, which led to unpredictable and inconsistent domain names. These attributes lead to poor usability, as observable through decreased productivity, sales, revenues and customer satisfaction, as well as increased training and support costs, development time and costs, and maintenance costs (Usability Professionals' Association, 2008). Specifically, poor domain name usability contributes to the \$US 3.2 billion phishing problem in the United States alone (Gartner, 2007).

The contribution to theory has been realised through a narrative recollection, which presented the researcher's inside perspective on the domain name industry, focusing on the end users' effective use of domain names; or domain name usability. The researcher provided first hand insights into the evolution of the Australian domain name industry (within the context of the international domain name industry). The researcher presented an industry insider account of the .au domain name policy development process as well as a view of policy formation from an international perspective.

Furthermore, a revised version of a submission the researcher made to an .au domain name policy advisory panel (the latest happening inside the Australian domain name industry), provided a practical example of how end users' needs are brought to the attention of domain name policy makers.

In order to address the problem of poor domain name usability, a framework for domain name policy evaluation is proposed.

Domain names are a user interface for the Internet. This new framework extends the current research that treats the domain name system as a user interface by proposing criteria which address usability and quality concerns. The framework sets out criteria which provide domain name policy makers with a means of critically assessing domain name policies with end users in mind.

The domain name policy evaluation framework in Table 34, and summarised below, can be used to evaluate the domain name policy for any domain name space, regardless of which level it occupies in the overall domain name hierarchy.

Criteria for domain name policy evaluation:

- Who are the intended users for the domain name space? *Consider end users of the domain name (not the domain name registrants).*
- How is the domain name space meant to be interpreted by the intended users?
- How else could the domain name space be interpreted by the intended users?
- Who are the unintended users for the domain name space? *Consider end users of the domain name (not the domain name registrants) who are not the intended users for the domain name space.*
- How could the domain name space be interpreted by the unintended users?
- Is the domain name space consistent compared with other domain name spaces for the intended or unintended users?
- What other semantic meanings does the domain name space have for the intended or unintended users?
- How easy is the domain name space to spell for intended or unintended users?
- How easy is the domain name space to type for intended or unintended users?
- How easy is the domain name space to say and pronounce for intended or unintended users?
- How memorable is the domain name space for intended or unintended users?
- How meaningful is the domain name space in the languages and scripts of the intended or unintended users?

7.3 Study limitations and future research

This study was developed from the researcher's perspective, as a participant in the domain name industry. A secondary lens, focusing on the usability domain names was then applied. This study has only scraped the surface in terms of how the research field of domain names and usability may be considered together, as domain name usability. For example, the means of measuring and testing the usability of domain names is not described in this study. Nielsen (2003) provides suggestions for methods which measure, test and improve the usability of a design.

The benefit of this study can be measured in terms of the value it provides end users in the form of more usable domain names. A future study, utilising focus groups with end users, could provide further insight into the ease of use of domain names which have been critiqued using the domain name policy evaluation framework.

The research methodology for this study was conducted primarily using a qualitative and interpretive approach. A comparative quantitative study of domain name policies globally could provide further insight into areas including: the differences in second level country code domain space (for example government second level domains such as 'gov', 'govt', 'gob' and 'go'), language and script implications of domain name spaces (for example confusingly similar Arabic script variants), and the semantic meanings of domain name spaces.

Other areas for future research which have been identified throughout the study include:

- analysing the relationship between the number and topic of messages sent to the .au DNS mailing list, correlated against the domain name policy changes which were being developed and implemented during the same time period;
- analysing the effect of domain name policy and price to understand domain name registrants' buying preferences;
- understanding the current value of the Australian second level domain (for example com.au, gov.au, etc) brands contrasted against the potential value of the .au brand for both the domestic and global markets;
- seeking evidence to determine if international users find hierarchical ccTLD structures difficult to navigate; and
- seeking evidence to determine if international users are more familiar with 'flat' ccTLD structures.

7.4 Concluding remarks

This thesis has provided an introduction into the field of domain names focusing on the specific topic of using domain names to improve Internet usability for end users. Evidence substantiating the need for research and articulating the benefits which it could derive were shown and research questions were developed. A methodical review and analysis of the existing literature within the research area provided the reader with context for the research questions, narrative and domain name policy evaluation framework. Notably, the literature review brought together previously discrete areas of study, domain names and usability; demonstrating a paucity of research on the new topic of domain name usability.

The use of an ethnographic approach to examine domain name policy presented the researcher's first person account as a domain name industry insider, both locally and internationally. This longitudinal study provided the researcher with multiple perspectives on a rich set of raw data. Furthermore, the researcher's empirical submission for an Australian domain name advisory panel provided a practical example of how end users' needs are brought to the attention of domain name policy makers.

Domain names are a user interface for the Internet. With an increasing number of people using the Internet, it is extremely important that end users' experiences are optimised through improved good domain name usability.

Domain name policy makers now have an opportunity to address the issues identified in this study regarding poor domain name usability. The framework for domain name policy evaluation provides a starting point for domain name policy makers to assess their policies, and for researchers to extend the new research topic of domain name usability.

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