Life online: The Web in 2020

A study by the Social Issues Research Centre
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1   Glossary

AI -Artificial Intelligence.

AJAX - Asynchronous JavaScript & XML a combination of web codes, mark-ups and formats through which the AJAX engine acts as an asynchronous intermediary between a user and server speeding up the stop-start nature of most web interactions. See: Google Suggest, Google Maps, A9.com.

CERN - Conseil Européen pour la Recherche Nucléaire (European Organization for Nuclear Research), where Tim Berners Lee developed the Worldwide Web.

Convergence - Usually used to refer to the increased sharing of resource infrastructures between telephony, internet and digital broadcast media. E.g. 4G phones.

Distributed processing - any computer system which uses more than one computer or processor to run an application, with each processor or computer running an application which is part of a sequence. E.g. SETI@home project to search for extraterrestrial life.

Flash mob - A large group of people who gather in a usually pre-planned site to do something unusual – like have a pillow fight – and then disperse again very quickly.

Folksonomies - Tagging system sites like Flickr, del.icio.us and technorati which allow users to tag / bookmark information on the Web that they would like to return to later, and which allows other users with the 'same vocabulary' to find it too.

Glocal - global products customised for local markets, many web applications have 'glocal' approaches, e.g. Google local. A term used by social scientists of transnationalism and globalisation to refer to the concurrent localisation and globalisation occurring across popular culture, business, government and more diffusely people's identities.

Generation 'C' - Like Generation X, Y and the MTV Generation before them, a term developed by the advertising and marketing industries to refer to the current cohort of young people in their teens and twenties who have grown up with ICT. "C" in this case stands for 'content, 'creativity', 'connectivity', 'collaboration' and 'communication'.

GNU - Is a free operating system, founded in order to preserve the ideology of open source, free to access software.

ICT – Information and Communications Technology.

IP – Internet Protocol.

IP – Intellectual property.

IP Multimedia Subsystem – Next generation convergence of telecoms incorporating Voice over Internet Protocol (VoIP) and 3G technologies run over standard Internet protocol.

LINUX – Computer operating system developed by open source and free software movement, Microsoft alternative - see GNU.

Mash ups – sites which combine content from other web sources into one integrated 'experience'.

Netiquette – Internet etiquette – rules of engagement for email, chat rooms, social networking sites etc…

Netizens – Internet citizen – person involved in online community such as *Second Life*'s 'residents' or social networking sites.

PDA – Personal Digital Assistant, handheld devices such as Treos and BlackBerries.

P2P – Peer-to-peer computer network used for file distribution and exchange.

Personal InfoCloud – applications and devices that let people hold on to information that they have interest in and move it across devices, as well as add their own context. (coined by Thomas Vander Wal who also coined 'folksonomy')

Phishing – Internet 'crime' whereby passwords, credit card details etc… are acquired fraudulently.

Prosumer – combination of 'producer' and 'consumer' a term used to refer to the Web users who are both consumers and producers of Web content.

RFID – Radio Frequency Identification technology involves a transponder emitting radio waves attached to a product, animal or person and allowing for automatic identification and location.

RSS – Really Simple Syndication, an XML system which allows Web users to subscribe to their favourite sites and receive formatted and customised 'news feed' style updates.

SaaS – Software as a service.

Smart Mob – See Flash Mob. Coined by Howard Rheingold to refer to the new 'intelligent' mobile social groupings who use mobile ICTs to co-ordinate their movements and meetings, often in the form of demonstrations in public space.

Web 2.0 – Generic term used to refer to the current developments in Internet and Web technologies, loosely defined by their collaborative, users-as-content-providers nature, and multimedia, multiple interfaces.

WiFi – Term used to refer to technologies of Wireless Local Area Networks which allow 'wireless' internet access.

Wikis – Sites which are open to collaborative authoring and editing.

VoIP – Voice over Internet Protocol – Internet telephony which routes voice conversations over the internet. Much cheaper delivery costs than traditional phone calls. E.g. Skype.

XML – Extensible Markup Language - is the simple flexible text format designed by Tim Berners-Lee's W3Consortium, and originally designed to meet the challenges of large-scale electronic publishing.

2   Highlights

The Web in 2020 will see:

- Technology convergence, heralding a single personal email/phone number for life and 'always on' connectivity coverage which – technically at least – has 100% global coverage…

- Software as a service will be the norm. This will involve outsourcing and streamlining everything from video conferencing to supply chain management…

- Mobile Web and Internet interfaces will increasingly no longer take the form of high end luxury gadgets, but will instead become utilities. We will still think of them as tools, but by 2020 they will increasingly have become 'transparent'. Like pen and paper they will be norms, which when in use, become extensions of our bodies…

- Technologies and applications which 'make it' will have stood the Technological Darwinism test. That is, they will enhance an already existing basic human need, such as the need to communicate, exchange goods and services, and shape our own identities, etc…

- The emergence of the Web and other Internet applications as a 'glocal' agora. A market place, meeting place and forum for gossip, debate, politics, entertainment and more, potentially creating…

- … a more socially aware generation – instead of seeing a rise in 'web based personality disorders', the space which online communities and

social networking sites provide for 'face work'[1] will see a generation of highly socialised and culturally sensitive individuals…

- Work spaces and work time will be more fluid (for some)…

- The Internet will be green – relying on technologies that require reduced energy, alternative energy sources and offsetting of contributions to carbon emissions

- The Web, online communities and social networking sites will have facilitated the development of an alternative economy. Supplementing a cash economy with a 'relative economy' this will see goods, services and time 'traded' by individuals, groups and perhaps even businesses both locally and across the world…

- The distribution of mainstream mass media – TV, film, music – will have changed significantly. Already Channel 4[2] have announced plans to sell domestic programmes over the internet. On demand pay-per-view packages, as well as 'bottom up' cultural production as facilitated by YouTube, will see media consumption further personalised and diversified…

- After some early teething problems, voting will be carried out online and via mobile technologies, this will have increased turn out figures, and resulted in more referendums being called…

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[1] Sociologist Erving Goffman coined the notion of 'face work' to describe how as social actors we behave differently in different situations. Although detractors of web-based social interaction see it as no substitute for 'real' face to face communication, it arguably provides a supplementary medium for socialising, and certainly demands the attention of social scientists. See: Goffman, E. 1959. *The Presentation of self in everyday life.* New York: Doubleday.

[2] Channel 4 to put all programmes on internet in viewing revolution. Dan Sabbagh. *Times online*. 16th November 2006. Available at: http://business.timesonline.co.uk

- ... However, several Digital Divides will persist. One will be a self-selecting 'lifestyle' demographic of largely middle class individuals living in the post-industrial West who will 'drop out' of the ICT revolution in a 'Luddite' by choice movement… the other, more disconcertingly, will be large numbers of people in Sub-Saharan Africa, parts of Asia and South America who simply do not have the means to 'connect' to the Internet…

3   Introduction: Life online

This is the final report in a series commissioned by Rackspace Managed Hosting. The previous two reports have addressed the factors which make for a 'Perfect website'; generating a formula for a perfect website and an analysis of the possible causes and symptoms of 'Mouse rage'.

This report is distinctive in both its scope and method, looking as it does toward a vision of the Web in the year 2020. It aims to provide an outline and analysis not only of projected *technological* developments but also their social, political and economic implications. What will the Web look like in 2020? What will it do? Where will it be? How will we use it?

SIRC's starting point has been the notion that the Web in 2020 will meet human needs more fully than it does at present, with many resulting social and political implications. It will have come to provide a renewed forum for social cohesion and democracy as well as continuing as a platform for information, entertainment, communication, shopping, etc. But will it, as some predict, provide a digital alternative to 'real life', with the distinction between Human and machine becoming ever-more blurred? Or will it, as we believe, be not so indistinguishable from the Web we know today. The year 2020, despite the sci-fi visions of some tech futurologists and TV programme makers, is only 14 years away. If a Web application, however complex and

sophisticated, does not fulfil a timeless human need then it will not succeed. While technology changes, people in general do not. They retain basic needs not only for physical survival and passing their genes to future generations but also for social bonding – a sense of place and knowing who we are in relation to others – and for conviviality and pleasure. In these senses we are today much like our earliest hunter-gatherer ancestors some 10,000 years ago – the first true technologists. Inside our 21st century skulls are essentially Stone Age brains.

Today, the online communities, shops (virtual high streets), VoIP services, libraries, newspapers, social networking sites, corporate homepages and interest groups inhabiting the Web are modern mirrors of our 'real' societies – the legacies of the tribal groupings in which we have spent all but a very tiny fraction of our history and evolution. Developed for the most part in North America and Europe, at a time when these societies might be defined as 'post-industrial' and even 'post-modern, these web applications – particularly the newer forms of 'social networking' and 'online communities' – have been developed and embraced by the masses because they provide a modern type of 'social glue', or at least 'social lubricant'. They arguably act to counter what the sociologist Durkheim termed 'anomie' – the isolation and fragmentation experienced as a result of the loss of the traditional ties that bind in contemporary society. Importantly, their production has also been appropriated by the masses, who in the process have – again arguably – taken technological and cultural production away from the hands of a few arbiters of 'the next big thing', 'taste' and so on, into the hands of the consumer.

As basic mechanisms for bonding and social cohesion are eroded in the faceless anonymity of modern towns and cities, we re-create new means for satisfying our timeless needs. We reinvent tribal groups in which we find a true sense of belonging, whether they be the familiar youth subcultures – the legacies of Mods and Rockers, Teddy Boys, Skinheads and the like though to modern Goths, Skaters, Gangstas and Moshers – or the more staid and

respectable Women's Institutes, churches, Residents' Associations and 'grown-up' groups with which we are so familiar. In this sense, nothing changes much apart from superficial style.

The Web increasingly serves such needs, allowing us to establish and maintain the same social bonds, only now we no longer have to rely on geographical propinquity – on being able to relate only with those people who happen to be nearby. Consider, by way of comparison, the mobile phone. This now taken-for-granted piece of technology has been seen as both a radical agent of change and the equivalent of the instrument of the Devil. But all it has done in reality is to allow us to return to the equivalent of an earlier form of social communication – simply chatting to one's neighbour over the garden fence, just to keep in touch and to say "hi". We are now much more mobile and our friends and family are no longer just next door. The text message or short call on a mobile, however, gives us back the closeness.

The Web does the same, and always will. The most popular Internet application is email, which conveniently replaces what in earlier times was achieved by the phone calls, letters, telegrams and, even further back in history, by the messenger on a horse or on foot. As Chrissie Hynde of the *Pretenders* once sang: "Something is lost but something is found … Some things change, some stay the same." In the context of modern technological advancement, and the Web in particular, how very true.

3.1   Some background

We all know that Information and Communications Technology (ICT) is developing fast. In June 1993 there were 130 websites,[3] today according to *Netcraft's* November survey there are some 100 million.[4]   In 1995 the

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[3] Kreitzman, L 1999. *The 24 hour society*. Profile Books. London pp. 123

[4] http://news.netcraft.com/archives/web_server_survey.html

Massachusetts Institute of Technology ITC Department's Programme on Internet and Telecoms Convergence published its inaugural cohort of postgraduate theses. One of those first papers was titled: *Connecting homes to the internet: an engineering cost model of cable vs. ISDN* (Sharon Gillets). Just 8 years later Erwan le Tanneur published a paper on *Residential Resale of Wireline Broadband via Wireless.* These provide just two examples of the rapid technological developments which are constantly changing the way ICTs are delivered to our homes, workplaces and increasingly every space in between.

In terms of current and near future predicted technological applications, projections range from the inevitable convergence of ICT infrastructures heralding the end of landline phone calls in the next 5 years, to science fiction visions of human lives lived in 'always on', seamless embedded virtual worlds, where the boundaries between the 'real' and the 'digital' are forever blurred and where AI outstrips human intelligence. Current technological developments and the predictions of tech futurologists regarding likely applications over the next 10 or 20 years – whether they be utopian or dystopian, or somewhere in between – have profound implications for our communities, relationships, identities, work and home lives. As Andy Clark suggests:

> *"What matters most is our obsessive, endless weaving of biotechnological webs: the constant two way traffic between biological wetware and tools, media, props and technologies. The very best of these resources are not so much used as incorporated into the user herself. They fall into place as aspects of the thinking process. They have the power to transform our sense of self, of location, of*

embodiment, and of our own mental capacities. They impact who, what and where we are."[5]

3.1.1 Web 2.0

Tim O'Reilly, internet pioneer and publisher, is considered to have coined the term 'Web 2.0'. For him, current Web 2.0 developments are seeing Internet applications coming to form an 'architecture of participation'. It is suggested that this current proliferation is:

"… a constellation made up of links between web applications that rival desktop applications, the blog publishing revolution and self-service advertising…It is an arena where the web rather than the desktop is the dominant platform, and organization appears spontaneously through the actions of the group, for example, in the creation of folksonomies created through tagging." [6]

Current Web 2.0 buzz centres around developments in telecoms technology convergence – software as a service, IP Multimedia subsystems technology (allowing for seamless roaming between fixed and mobile networks) and more broadly, of course, the huge popularity of the collaborative internet, mash-ups and social networking sites and all the implications these have for businesses and advertising, as well as our notions of identity and community. In October 2006, Reuters launched a news bureau to serve the online *Second Life* community. (*Reuters opens virtual news bureau in Second Life* – available at: http://secondlife.reuters.com). In November, the *Big Brother* production company, Endemol, announced it will launch an international version of the reality TV show on *Second Life*. It is perhaps pertinent to point

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[5] Cognitive scientist Andy Clark, see Clark, A. (2003) *Natural Born Cyborgs*. Oxford: Oxford University Press (page 198)

[6] Ryan Singel. *Are you ready for Web 2.0?* – www.wired.com

out however, that despite the rhetoric, social networking and online communities such as *Second Life* are not necessarily democratising or equal, not everyone is contributing, or contributing on the same level; consumers are still more prolific than producers.

Hype around Web 2.0 as a new era for investment, innovation and entrepreneurship seems well grounded when *MySpac*e sells for $583 million and *YouTube* for $1.65 billion. From 'bottom-up' beginnings, as the product of amateur enthusiasts, so-called techie-geeks, creatives and academics, the Web on a business level has become what many consider a pre-eminent example of free market capitalism let loose. The venture capitalist John Doerr is famous for calling the 1990s ICT boom "the greatest legal creation of wealth in human history". This current era of relatively unregulated free reign is perhaps the most likely area of change. Governments, lawyers and policy wonks are circling…

November 2006 saw several high profile web conferences. At the start of the month business, government and policy makers gathered in Athens to attend the first UN-convened Internet Governance Forum. Online remote participation, webcasts and chatrooms were the agenda for three days of discussion that saw the future of the internet discussed in terms of 'openness', 'security', 'diversity' and 'access'. November also saw the third annual O'Reilly Web 2.0 summit held in San Francisco – its aim being to bring leading tech experts together to discuss how to best to use the Web as a platform, a foundation on which a multitude of new businesses and business models will develop.

Also in the same month, Worldwide Web 'creator' Professor Sir Tim Berners-Lee announced the launch of an MIT/University of Southampton linked research centre, the 'Web Science Research Initiative', tasked with looking into future applications of the Web and its possible *social* and *political* implications. It has the financial backing of *Google* and *IBM* and is

particularly concerned with understanding the Web as it is, and as it will be and with creating a new generation of web scientists – part techies, part anthropologists. Berners-Lee has also recently received press coverage for his warnings that in the future the Web could be used to spread 'misinformation' and that attempts by telecom companies, particularly in the US, to charge for different levels of online access, threatens a two-tier future for the web. For Berners-Lee and other 'Net neutrality' proponents, this is very much against the grain of the Web's founding ideologies.

At the same time fears over security, both personal and over issues such as terrorism are increasingly drawing the attention of governments and policy makers.

There is little doubt that we have reached a crucial stage in the history of the development of the Internet, and of the Web as just one Internet application. As technologies they are moving swiftly away from being novel to becoming accepted, relied-upon tools. There are now competing and often incompatible views about where the Web is at and where it should or might be going. These diverge across technology specialists working in ICT fields, ICT businesses, policy makers and lawyers and commentators of various hues, from Howard Rheingold and Andy Clark to Stanford Law professor, Lawrence Lessig, writing in the pages of *Wired*, and many an anonymous blogger.

Generalising slightly, these differing visions can best be characterised as the 'standardisation/regulation' (through design and/or policy) argument, which calls for business, governments or NGO-led policy and legislation on issues such as access, IP, privacy and security. On the other hand is the argument for continued, unregulated proliferation (perhaps something of a myth now anyway) and an open source future. Both visions in many ways let the market decide, but differ over how 'choice' is regulated or built in to the

architectures of ICT. Tech sociology guru Howard Rheingold quotes
Lawrence Lessig the pro open source Stanford professor and lawyer:

> *"Because nobody controlled what people did with the Internet, millions*
> *of people invented new things to do with the Internet. They innovated*
> *because they had a guaranteed right to publish web pages or start*
> *businesses or create applications like the Worldwide Web. This*
> *explosive innovation happened because the Internet was held in*
> *commons – an innovation of commons – instead of auctioned off.*
> *Policymakers, faced with the opportunity to create an innovative*
> *commons for the wireless Internet, want to sell the right to innovate to*
> *the highest bidder. We're at a critical point where we're choosing*
> *which path to go down..."* [7]

3.1.2 Technological Darwinism

We should not forget that the Internet and Web are first and foremost tools
designed by humans for facilitating communication and exchange and as a
space for information – basic functions now accompanied by a proliferation
of many other enhancements. The early days of development were, and are,
also characterised by other very human propensities; our need to connect, to
give our lives meaning and our sense of *fun*. For example, the first webcam
was developed by researchers at Cambridge University's computer labs. Its
purpose? To provide a way for staff to monitor whether the department coffee
percolator was full or empty and thus save themselves a fruitless journey
down the corridor.[8] Similarly, the pioneers of person-to-person or distributed
processing were a global group of amateur enthusiasts pooling their computer

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[7] Rheingold, H. (2003) *Smart Mobs: The Next Social Revolution*. Cambridge MA: Basic Books.

[8] See: www.cl.cam.ac.uk/**coffee**/**coffee**.html

memory in order to search for extraterrestrial intelligence, the ongoing cooperative venture known as SETI@home.[9]

These examples, and subsequently of course, many millions of others, perhaps provide some evidence of the Web providing a medium for the unfettered proliferation of "…*the unconscious reciprocal altruism that is rooted in our genes...*" [10] and, crucially, the particularly human proclivity for creativity and the compunction to share, open up for criticism and exchange the fruits of creativity.

Our need to network is certainly as old as we are as a species. But the Internet *is* different from letters, telegrams, faxes, celluloid, radio, television and telephony. This difference is one of *medium*.

'Media', the plural of 'medium' refers to "a means or agency for communicating or diffusing information" or in physics "an intervening agency for transmitting or producing an effect".[11] Marshall McLuhan, considered by many to be the first sociologist and prophet of the mass media age, coined the phrase "the medium is the message", as well as pre-empting theories of globalisation in his notion of the 'global village'.[12] "The medium is the message" was used by McLuhan to characterise the changes in broadcast and mass media occurring in the 1950s and 60s. Forty years later the Internet is considered so revolutionary because for the first time in our history it provides a medium through which written and spoken words, as well as images can be communicated and exchanged through one 'platform'. The urban sociologist Manuel Castells, writing in 1996, suggested that HTML code is a 'super text' which:

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[9] See: http://setiathome.berkeley.edu/ a collaboration hosted by UC Berkeley's Space Science Labs, which harnesses the processing power of individual Internet connected computers to analyse radio telescope data.

[10] Rheingold (2002: 212) op cit

[11] *Collins English Dictionary* 1992. HarperCollins.

[12] McLuhan, M 1964. *Understanding Media: The extensions of Man*. MIT press.

> *"…for the first time in history, integrates into the same system the written, oral and audiovisual modalities of human communication."*[13]

In addition, the advent of Web 2.0 technologies have provided the means for *many* people to communicate in two-way dialogue with many other people, in real time. If the medium is the message then the message is now the *multimedia 'glocal' network*.

The internet 'revolution' has changed, and continues to change, the ways in which we organise the world – how we give it meaning, how we interact and how we view ourselves and others.

> *"…We humans have indeed always been adept at dovetailing our minds and skills to the shape of our current tools and aids. But when those tools and aids start dovetailing back – when our technologies actively, automatically, and continually tailor themselves to us, just as we do to them – then the line between tool and user becomes flimsy indeed. Such technologies will be less like tools and more like part of the mental apparatus of the person. They will remain tools in only the thin and ultimately paradoxical sense in which my own unconsciously operating neural structures (my hippocampus, my posterior parietal cortex) are tools…. we are natural-born cyborgs, forever ready to merge our mental activities with the operations of pen, paper and electronics"*[14]

As well as designing technologies, we also of course adapt to and evolve alongside them. Paper, writing and the print press changed the way our previously oral literacy shaped thinking. We think through speech and through writing, [15] and in 2006 we increasingly think through typing, texting,

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[13] Castells, M. 1996. *The Rise of the network society.* Oxford: Blackwell. (Page 328)

[14] Andy Clark, excerpt from *Natural Born Cyborgs* op cit available at: www.edge.org

[15] Clark notes: "Human thought and reason emerges from a nest in which biological brains and bodies, acting in concert with nonbiological props and tools, build, benefit from and then rebuild an endless succession of designer environments. In each setting our brains and bodies couple to new tools, yielding

making blogs and PowerPoint presentations. Technological developments demand that we expand our repertoires of communication skills. But in many ways they merely provide alternatives and additions to age old tools and 'media': the quill, the carrier pigeon, the smoke signal, the telegram, the garden fence [16] or market place:

> *"Talk of cyborgs, hive minds and collective consciousness may sound fantastic (or at least very Californian). But the ability to use technologies to collectively extend our bodies and minds is what distinguished homo sapiens from our Neanderthal competitors, encouraged the development of speech, allowed us to hunt big game and practice agriculture, drove us to build cities and invent writing. It isn't science fiction. It's civilization."* [17]

SIRC's conceptual framework for this research (what we call 'technological Darwinism') argues that only where technological advances provide novel means for basic human exchanges – social, material, intellectual or otherwise – are they likely to succeed. Technologies that do not enhance this repertoire of competencies, or which are ultimately difficult to adapt to, are likely to be stripped away and replaced. There are many high profile examples of web start ups which failed the technological Darwinism test. One of these dot.com era failures, *Flooz.com*, managed to only survive from 1998 to 2001. *Flooz* was a start-up which sold an 'online currency' which could then be used in the form of a gift certificate at one of its partnering online stores. Unlike *LindeX*, the currency used by Second Lifers *in* Second Life, this alternative

new extended thinking systems….By this magic, seeded long ago by the emergence of language itself, the ratchets engage and the golden machinery of mind-design, mind redesign and mind re-redesign rumbles into life" (2003 pp. 197).

[16] SIRC's previous research on mobile phones argued that by facilitating therapeutic gossip in an alienating and fragmented modern world, mobiles have become a vital 'social lifeline', helping us to re-create the more natural communication patterns of pre-industrial times. (Evolution, Alienation and Gossip:*The role of mobile telecommunications in the 21st century.* Available at: www.sirc.org)

[17] See: Alex Soojug-Kim Pang (no date) *Rise of the machines*. Institute for the Future. Available at: www.iftf.org

currency it seemed, merely complicated online transactions which could just as easily be carried out using a credit card. *Flooz* created an imagined need with no useful purpose.

This is not to say that market-led competition does not have a huge influence; that the 'better' (more adaptive / adaptable) products will always win out in a process akin to 'natural selection'. Rather, as Microsoft's continued dominance shows, it is often the most successful companies who win out – those who importantly have the resources to set the research and development (R&D) agenda in this area.[18] The ICT industry as a whole is rapidly changing and volatile. But the high profile Web 2.0 success stories (and indeed those of the dot.com boom) *are* all generally characterised by their concept-led, small-beginnings scenarios. In many ways it is them – YouTube, Facebook, MySpace, del.icio.us – who are leading the way.

Our conception of 'technological Darwinism' entails, as Howard Rheingold suggests, that:

> *"…the most far-reaching changes will come, as they often do, from the kinds of relationships, enterprises, communities and markets that the (technological) infrastructure makes possible."*[19]

Technologies which facilitate interactions beyond basic notions of zero-sum win/lose scenarios are also more likely to succeed. Human reasoning is complex, contradictory, nuanced and context dependent – something as yet un-replicated by any computer programme.

Gartner, the technology research analyst firm, is well known for its 'Hype Cycle' model, [20] charting six stages of a hyped technology's 'life'. These are:

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[18] Microsoft's own multimillion dollar R&D programme in 2005 opened up to small businesses and entrepreneurs, with the aim of tapping into this mine of small scale innovation. See: www.microsoft.com

[19] Rheingold, H. 2002. *Smart Mobs: The next social revolution.* Cambridge MA, Basic Books.

[20] Available at: http://www.gartner.com/pages/story.php.id.8795.s.8.jsp

'technology trigger', 'peak of inflated expectations', the 'trough of disillusionment', 'slope of enlightenment' and 'plateau of productivity'. Any particularly hyped technology or application goes through these stages. The successful ones make it to the Google, VoIP, MySpace heights. Many others fall by the technological wayside.

Gartner's projected three key technology areas in 2006 are social network analysis based: Ajax, collective intelligence and 'mash ups' all three, particular technologies and applications which characterise Web 2.0 hype. They are seen to describe a 'Real world web', integrating location-aware technologies and applications and 'Applications architecture', with a shift towards software as a service. Jackie Fenn, the inventor of the first hype cycle and a Gartner fellow, suggests that: "One of the features highlighted in the 2006 Hype Cycle is the growing consumerisation of IT… 'Many of the Web 2.0 phenomenon have already reshaped the Web in the consumer world'…"[21]

There is also a connected aspect to note here – that of the rate of 'take up' of new technologies among different demographic groups in society. E.M. Rogers, a Communications academic and author of "Diffusion of Innovation", [22] suggests that there are five general groups – 'innovators', 'early adopters', 'early majority', 'late majority' and 'laggards' who adopt new technologies at different rates.

Beyond the hype of Web 2.0, and its perhaps exaggerated expectations, we can expect that the Web in 2020, and any 'Web 3.0' applications, will be the product of a period of further disillusionment followed by a period of unevenly distributed take-up. [23]

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[21] Gartner's *2006 Emerging Technologies Hype Cycle Highlights Key Technology Themes*, available at: www.gartner.com

[22] Rogers, E. M (1962) *Diffusion of Innovations*. (First edition) The Free Press. New York.

[23] For example, The *New York Times* recently reported in an article heralding the future of Web advertising being UK-led, that: *"…on average Britons spend 23 hours a week on the Internet, according to the Internet*

With all this and more in mind, what might the Web in 2020 really look like? What will it do? Where will it be? What will this mean for us as individuals, for our social networks, work life, societies and nations? What aspects of the Web will be so ubiquitous that they have become norms? As part of Rackspace's commissioned research series, SIRC has been investigating these questions …

3.2 Existing predictions for the future of the Web

Tim Berners-Lee on the Web at 30 in around 2020:

"…When it's 30, I expect it to be much more stable, something that people don't talk about. Really when you talk about an article, you don't say, "Oh, I'm going to write an article on paper!" The fact that we use pen and paper is sort of rather understood…Similarly, the web will be, hopefully something which is sunk into the background as an assumption…My goal for the web in 30 years is to be the platform which has led to the building of something very new and special, which we can't imagine now…" [24]

Current predictions for the future of the Web range from the development of a Semantic web[25] which builds 'machine reasoning' into Internet functions through standardised 'languages', and has the potential to facilitate an Artificial Intelligence 'emerging' spontaneously from the Google databases. To the more foreseeable convergence of telecom infrastructures meaning that

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Advertising Bureau…Americans use their computers on average of 14 hours a week, according to Neilsen Media Research". Available at: www.nytimes.com

[24] BBC Newsonline interview 2005, available at: http://news.bbc.co.uk/go/pr/fr/-/1/hi/technology/4132752.stm

[25] The Semantic Web will see a new 'markup language' and re-organisation of information currently available on Web. The theory goes that this will allow computers themselves to understand and use information analogous to an AI 'collective consciousness', by way of 'inference' protocols. Critiques of Semantic web developments suggest that it will necessarily be based on syllologisms and deductive reasoning which does not represent the contradictions, nuances and complexities of human cognition and reasoning, thus undermining predictions of a spontaneously generated AI.

all future telephony is via the Internet, and that we have a single private email and phone number for life. Predictions range from the sci-fi sublime to the more prosaic and practical, from the utopian to the doomsday.

The well-regarded, if at times overly sci-fi *BT Technology Timeline*, suggests that between 2013 - 2017 most computers will be able to write their own software. Before 2010 most homes will have wireless connections and we will be using personal remote web servers. The year 2010 will also see 'Minority Report' style e-linked advertising billboards responding to the personalised RFIDs – radio frequency identification technologies – held on our handheld PDAs. By 2012 we will see online voting and mass internet rallies and 80% of internet access from mobile devices along with single combined addresses for email and phone calls. By the 2020s, thought recognition will be functioning as a means of information input.

The timeline also makes some rather controversial predictions, such as suggesting the growth of a 'Second Internet', with guaranteed security for email and no spam. The US National Science Foundation funding of the Global Environment for Networking Investigations (GENI) initiative is researching technology architecture alternatives for the Internet. Its research remit comes down between the 'clean slate' approach which posits that the current Internet's 30 year old infrastructures are creaking and in need of all out replacement and the view that enhancement of the Internet should come through additional services and applications which work with current technologies. [26]

Elsewhere, the Elon University / Pew Internet Project (incorporating some of the BT predictions) projects that by 2020 we will be largely living in what it calls 'immersive virtual reality worlds', where wireless connectivity and computer generated environments will have radically altered our daily lives.

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[26] See: www.geni.net

Rheingold exemplifies this in his description of the Tokyo of the present:

> *"Peer to peer collectives, pervasive computing, social networks and mobile communications multiply each other's effects: Not only are millions of people now linking their social networks through mobile communication devices, but the computing chips inside those mobile devices are growing capable of communicating with radio linked chips embedded in the environment. Expect startling social effects when the 1,500 people who walk across Shibuya Crossing at every light change can become a temporary cloud of distributed computing power…"* [27]

The recent Pew Internet/American Life Project Report: *The Future of the Internet* [28] reports that there is broad consensus among experts on the likely *technological* developments of the Web and Internet over the next 15 years.[29] The authors suggests that by 2020 "a low-cost global network will be thriving and creating new opportunities in a 'flattening' world…" And that: "virtual reality will be compelling enough to enhance worker productivity…" Interestingly, out of those experts surveyed, 46% suggested that the Internet will have made the world a better place, while 49% disagreed. Where predictions diverge among specialists, is primarily over the *sociological* issues and implications surrounding the changes wrought by technological development.

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[27] Rheingold (2003) op cit page 66.

[28] Based on extensive consultation with ICT stakeholders including academics, internet 'pioneers', technology specialists, commercial technology developers, bloggers and others. Available at: http://www.pewinternet.org/

[29] The Elon University / Pew Internet Project site "Imagining the Internet" (Available at: http://www.elon.edu/predictions/) also contains a vast library of predictions for the future of the Web starting from the early 1990s. These now make for intriguing reading given the unprecedented changes in Internet applications, the proliferation of the Web and peoples access to it. The report itself is available at: http://www.pewinternet.org

These divergent views, as discussed above, can best be characterised by the political-economic frame from which a particular expert is working. There seem to be two camps: those who want the Web and its contents to be regulated and controlled, and those who do not. In addition there are those who are cynical about the continued notion of the Web as some kind of uber-democractic sphere, and those who see it increasingly being governed by the not so invisible hand of the market and the powerful influence of business and government interests. It is a mistake to pit these opposing camps along 'big business' (Murdoch, Google, Yahoo, Microsoft) versus Web 'small fry' and alternatives (anonymous bloggers, GNS/Linux and the open source movement). The picture and debates are more complex than this and are a result of the people – their politics and personal philosophies – themselves involved in pioneering these technologies.

The ideologies underpinning the Web were born out of a heady combination of free market capitalism, libertarianism and communitarianism. There has been much comment that the early successes of the Internet – and indeed the fact that its global nexus, Silicon Valley covers the locales to the south of San Francisco, considered by many the birthplace of the 60s – have "…an almost direct lineage to the liberal politics of the 1960s anti-war and civil rights movements… underpinning the technology movement has always been a sense of community."[30] But early utopian 'anarchy' has – despite the continued proclamations of some Web idealists – been replaced by personalisation,'netiquette', billion dollar deals, and competition. It surely can't be long before a successful brand emerges out of *Second Life* to find commercial success in the 'real world'. Indeed, according to a *Popular Science* article,[31] *Second Life* already has a GDP of US$64 million.

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[30] Dan Fost (2005) *Digital Utopia*, available at: www.sfgate.com).

[31] Available at: http://www.popsci.com/popsci/

Despite the proclamations of some 'digital utopians' that Web 2.0 applications are heralding a revolutionary democratization process, it is perhaps too soon to say. Its lexicon certainly borrows from a mish mash of third way politics, 60s counterculture and management speak, all sounding rather hollow, idealistic and as yet unfounded. As Andrew Keen wrote in his CBS column, which attracted a lot of attention with its headline "Web 2.0 is reminiscent of Marx": "…Buzzwords from the old dot.com era like 'cool', 'eyeballs' or 'burn rate' have been replaced in Web 2.0 by language that is simultaneously more militant and absurd: *Empowering citizen media, radically democratize, smash elitism, content redistribution, authentic community…*"[32]

Keen is critical of the rise of the self appointed narcissistic citizen journalist and of the potential overabundance of authors: *"Web 2.0 technology personalizes culture so that it reflects ourselves rather than the world around us… One of the unintended consequences of the Web 2.0 future may well be that everyone is an author, while there is no longer any audience."* It is not historically unusual for the consumers of traditional 'high culture' to denigrate the tastes and consumption patterns of mass-consumed 'low culture' in such a way, but perhaps he has a point. At the same time however, there is little doubt that the era of the 'prosumer' has laid down a gauntlet to old media, business and government.

As a means to contextualize past, present and future visions of the Web, SIRC have developed a Web timeline, detailing the story so far…

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[32] Available at www.cbsnews.com

3.3 From Web 1.0 to Web 3.0: a timeline

3.3.1 1993 - 2000 Web 1.0

- 30 April 1993 CERN announces that the Worldwide Web can be used by anyone with a connected computer, for free [33]

- Worldwide Web browsing

- html programming code

- 1994: BBC launches first website, www.whitehouse.gov launched by Bill Clinton, first banner ads appear…

- web as 'library'

- The 'information superhighway'

- a web of *documents* characterised by Britannica Online, personal websites, directories and publishing

- 1995 the web was "…*still populated by early adopters, defence contractors, techies and academics. It was completely unclear whether it would spread beyond that to consumers and business users. People still thought interactive TV would rule the world.*" [34]

- e-commerce. 1995 saw amazon.com and eBay launched…

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[33] Sourced from BBC News online: newsvote.bbc.co.uk among others

[34] Marc Andreessen, co-founder of Netscape interviewed for Wired.com 13.08, August 2005. "10 years that changed the world".

- 1995: dot.com boom starts, 18957 websites online …only 45% of Americans have heard of the worldwide web[35]

- 1996: Hotmail launched, 342081 websites online

- 1997 Google search engine launched

- 1998 first blog 'open diary' launched

- 1999 Everquest, multiplayer online role play game launched, Napster launched

- 2000 dot.com boom reaches peak, and bust starts, 20 million websites online

Bill Gates was on the money in 1995:

"The term 'highway' … suggests that everyone is driving and following the same route. This network is more like a lot of country lanes where everyone can look at or do whatever his individual interest suggests... A different metaphor that I think comes closer to describing a lot of the activities that will take place is that of the ultimate market…" [36]

3.3.2 Now and soon: The era of the 'prosumer'

Wired editor, Kevin Kelly, views the massive growth of the Web over the past 14 years with awe, asking:

"…How could we create so much, so fast, so well? In fewer than 4,000 days, we have encoded half a trillion versions of our collective story and put them in front of 1 billion people, or one-sixth of the world's population. That remarkable achievement was not in anyone's 10 year

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[35] Ibid.

[36] One of many expert predictions made in the 1990s on the future of the web, archived and available at: http://www.elon.edu/e-web/predictions/early90s/

plan....Why aren't we more amazed by this fullness? Kings of old would have gone to war to win such abilities. Only small children would have dreamed such a magic window could be real..." [37]

Out of the ashes of the dot.com bust of 2001 emerged the commercial success of phoenixes such as:

- Google, whose corporate mantra is "to organise the world's information and make it universally accessible" and "Don't be evil", rode the bust, going public in 2004

- Commercial market sites such as eBay and Amazon – both of which are survivors of the dot.com bust

- Web as 'market'

- 2001, Wikipedia and wikis launched

- 2003, Apples iTunes launched

- 2003, 520 million mobile phones sold worldwide…[38]

- First 'flash mob' organised via Web

- social networking sites such as MySpace start to gain popularity

- 'Mash-ups' – sites combining data from different web sources into one integrated experience - such as GeoIQ Heat Maps from Google Maps

- AJAX combination technologies allowing for faster more seamless web user experiences - see Google Maps and Google Suggest.

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[37] Kelly, K. "We are the Web". In: *wired.com* 13.08 August 2005. Available: www.wired.com

[38] Wired.com 13.08 August 2005. "10 years that changed the world".

- Rise of GNU/LINUX and other open source / free software

- Blogging

- Folksonomies such as del.icio.us, Flickr and Technorati gain popularity

- RSS feeds used widely

- 2005, YouTube launched

- 2006, Second Life, MySpace, YouTube, del.icio.us, Flickr and Bebo are the sites *du jour*

- November 2006, over 8 billion websites online

- Current Web 2.0 applications tend to be characterised by their users-as-content-providers. Prosumers reform the network in interactive, collaborative ways

4   Social analysis: Web sociology 2020

4.1   The near future

4.1.1   2010 - 2020 Web 3.0: the multimedia glocal [39] network

"Web 2.0" buzz around telecoms convergence, the Semantic web and composite applications such as distributed processing, peer to peer distribution and social software will proliferate over the next decades. …Google's recent release of Google Maps is a case in point. Google Maps' simple AJAX (Javascript and XML) interface was quickly decrypted by hackers, who then proceeded to remix the data into new services."[40]

By 2020 we will see the Web develop as a true 'agora' – the Twenty-first century equivalent of the ancient Greek marketplace and forum for citizens of the polis to attend for entertainment, gossip, shopping, debate and politics. We will also witness:

- Convergence of telecoms, and ICT. Heralding a single personal email/phone number for life

- Greater personalisation and customisation of software and hardware

- Greater blurring of 'real' and virtual – ICT will blend into our daily lives to become taken-for-granted norms

- An 'always on' society defined by WiFi Web / internet connectivity

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[39] 'Glocalisation' was a term first used by Japanese social theorists to talk about the concurrent localised and globalised experiences of people in the late twentieth century. The Pew Internet report "The Strength of Internet Ties" (2006) uses it with specific reference to email: "Email is a tool of 'glocalisation'. It connects distant friends and relatives yet it also connects those who live nearby".

[40]   O'Reilly Network: What is Web 2.0? www.oreillynet.com

Web sociology guru Howard Rheingold argues that the success of online communities and social networking sites are the result of people's need to recreate lost 'social capital' – the fall out of post-Fordist, post-industrial societies where the old ties that bound us together have been dismantled. Certainly the mass appeal of social networking sites and online communities plays to the founding ideology of the Internet as one of connection, communication and exchange.

But will the current trend in social networking and online communities be a passing fad? What will online networking look like in 2020? Will they develop as "*Technologies of cooperation, or the ultimate disinfotainment apparatus?*"[41]

The current 'Generation Web 2.0' or 'Generation C' – C standing for content /connectivity/creativity/collaboration/communication – will be middle aged by 2020. This generation have grown up under the Web ideologies of open access, co-operation, exchange and sharing of information, as will all further generations. This will have profound implications for our societies. Although the tendency is to focus on negative implications – unsociable generations only able to connect via the web, predators stalking social networking sites, piracy, spam, phishing and identity theft – we suggest that although these will remain as problems, they will not predominate and a more positive future lies ahead.

The Web is a media for communication. Any future communications 'revolution' will mean that new forms of social capital and networks are likely to be amorphous and no longer limited by geography. Our social relationships are likely to be different, but fundamentally the same. Are MySpace, YouTube and others in many ways heralding the end of the Group and the rise of the Network? Our suggestions include:

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[41] Rheingold (2003) op cit, page 215

- Potentially, 'Generation C' will be 'nicer' – more able to communicate with a wider cross section of people and find common ground across previously divisive differences.

- Ever more fluid boundaries for our identities will have formed; the result of a blurring of public and private space, but dependent on…

- …as Rheingold puts it, whether: "*… pervasive computation devices and anthropomorphic software agents lead people to confuse machines with humans, will people grow less friendly, less trusting, and less prepared to cooperate with one another?*"

Such projected developments are dependent on the rate and depth of technology 'take up'. We might all be carrying around PDAs with 2GB of memory but if we are just using them to play solitaire…

"To really make the most of the wired world, we need to understand – at least approximately – how it works. Only then can we take the measure of its weaknesses and strengths, and adjust our own role, as human participants, accordingly. Technological education will be crucial if human-machine co-operation is to enrich and humanise rather than restrict and alienate. Once again, the lesson seems clear: Know Thyself: Know Thy Technologies."[42]

Social networking sites and new forms and networks of online communities will have proliferated. Sites such YouTube, MySpace, Flickr and others will develop in terms of the kinds of applications and multimedia options they offer, but will not diversify, instead carving particular niches for themselves. We will tag recommendations, photos, observations, reminders and reviews with the use of WiFi connections and location-aware mobile phones. New peer to peer software applications will mean that Web users can share,

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[42] Clark, A (2003) op cit

manipulate and customise information to their needs and integrate these across all aspects of their social lives.

The difficulty some still have in reconciling the image of the 'anti-social' IT geek spending more time in *Second Life* than talking with his or her partner, will have quickly passed into recent history.

4.2   The Web: Identity, social cohesion and the rise of 'web tribes'

Rheingold calls them 'Smart Mobs' but we suggest that 2020 will have heralded the Rise of 'Web Tribes'. Multiple-membership web tribes are characterised by the flexibility they offer in belonging to lots of different interest groups. They will allow us to find new ways to connect, with 2020 seeing an expansion of different types and numbers of online communities, and also further – revolutionary – developments in the production and consumption of culture and media which Web 2.0 is currently witnessing. You might be into a particular new form of urban contemporary dance performed by avatars and want to chat with performers and choreographers, while at the same time kick back and discuss where to buy retro ICT gadgets from the early 1990s. Multiple membership of diverse 'web tribes' will allow us to do this. There will be a proliferation of different Web cultures, each with its own lexicon, symbols, codes and rules.

Proliferation of interest groups, and the freedom to belong to as many or as few as you wish, means that the new 'Web Tribes' are not in conflict but instead reflect the quirkiness of their individual community members' collective interests and preferences. Members themselves 'play' with different roles and identities, allowing for a new take on the age-old need for 'face work' – that is, the honing our social skills which allow us to interact differently with different people in different contexts.

There has been some suggestion by futurologists that such multiple online identities may lead to 'personality disorders'. It could, however, be more helpful to consider this socio-cultural development with the conceptual

framework of positive social psychology. Rather than developing personality 'disorders', people are likely to function in a larger variety of virtual and actual social spaces, adapting to new environments which potentially allows them to become more socially aware and sensitive individuals in the process. Difference, diversity and choice are no longer idealistic pipe dreams. They are what best describes online life in 2020 and will help us to understand 'who we are' more fully.

The opportunity for 'pseudonymity' – taking on a 'false' name – which social networking sites currently engender is an important aspect of their success. This has been viewed as a negative experience by many commentators. But as a respondent to Danah Boyd's [43] blog article on whether MySpace is just a passing fad, commented:

> *"…there's something cool and liberating about the pseudonymity that the Web brings…it's sort of like being on vacation in a foreign land, maybe folks feel that they can be less restrained. While this can bring challenges to those who administer a social network, it sure makes it more interesting…"[44]*

Social bonding in the real world is really about finding people 'like us'. We may be deluding ourselves to think that social networking on the Web heralds a revolutionary connection between hitherto diverse individuals. Web-based social networking will always contain an element of what Danah Boyd calls 'digital xenophobia' – the rejection and even stigmatisation of certain types of people, even though we might deny it. Social networking sites and online communities help us to find like-minded souls. But such 'in-group' bonds, whether established face-to-face or more remotely via the Web, are inevitably strengthened by knowing who we are not like (or don't like) as much as who

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[43] A University of Southern California social theorist

[44] Available at: www.zephoria.org

we do. This is a timeless facet of human nature and the Web in 2020 will not change that.

A report by the Pew Internet think tank *The Strength of Internet Ties* found that using the Web and email is helping us to strengthen our social ties – to promote what Barry Wellman calls 'networked individualism'. "*Because individuals – rather than households – are separately connected, the internet and the cell phone have transformed communication from house to house to person to person*". [45]

The Web is thus creating and engendering alternative forms of 'Social Capital' and perhaps more importantly for younger Web users, '*Sub*-cultural Capital'. An insider's knowledge cannot be bought. MySpace is predominantly used by what sociologists call 'youth cultures' (teenagers to the rest of us) to share information and try out different identities. It facilitates social sharing and identity production, but little else. The MySpace users of today will not stay on MySpace forever, but they will be shaped by their experiences there and some will be the Web entrepreneurs of 2020.

MySpace 'friends' and the collaborative 'folksonomies' creating sites such as flickr and del.icio.us are tagging systems, identifying people by their 'favourites', and are also likely to persist and become more refined. Danah Boyd again suggests that the current tagging trend is so fascinating because it is, in effect, creating a new culturally specific symbolic language, engendering new meanings and values. Alternative cultural forms are emerging from del.icio.us and MySpace – created in the virtual arena of the Web but in turn coming to influence the 'real' world. They are like the scrapbooks, diaries, lists of favourites and 'memory' shoe boxes of previous

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[45] Boase, J. et al 2006. *The Strength of Internet Ties: The internet and email aid users in maintaining their social networks and provide pathways to help when people face big decisions.* Pew Internet and American Life project. Available at: www.pewinternet.org

teenage generations. These sites allow 'free' self-expression, they allow users to play with their identity and they allow us to connect, fast. A quick 'Hi, how are you?' message left on MySpace is, as SIRC's previous research into mobile phone culture showed, [46] a form of social grooming – the kind of grooming in which other primates engage in order to reinforce social bonds and a sense of group belonging. Although the technology and medium might change, the function for the most part, remains the same.

The online reaction to the recent murder of teenager Anna Svidersky in the US gave a particularly useful insight into the strong network of social bonds created on sites such as MySpace. Aspects of this phenomenon were disturbing – an outpouring of mass grief for a girl that most of the community had never met – but the phenomenon itself was illuminating as an illustration of the kind of social capital generated by networking sites. Online communities are no longer seen as the preserve of geeks with no friends. Now, and certainly by 2020, if you are 16 and not on MySpace or an equivalent, it will be you that has no friends…

The current era of the internet is essentially 'bottom-up', using folksonomic tagging and collaborative effort (e.g. Wikipedia) to create an open and collectively spirited community. Users are constantly creating and redefining online content and the new wave of sites place networking and open collaboration at their centres. They are about the need for 'social glue', but also for the need for self expression, a sense of agency and choice. But as highlighted earlier this bottom up production is not uniform or inclusive, consumers still outnumber producers.

The technologies and applications allowing this will continue to be refined and will mean that by 2020 issues of identity and belonging to groups and

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[46] See *Evolution, Alienation and Gossip: The role of mobile telecommunications in the 21st century.* http://www.sirc.org/publik/gossip.shtml

networks will be characterised by diversity and fluidity. Our relationships will no longer be restrained by geography, the limits of shared language or national borders.

4.3   The Web and work

Work practices will have changed for some sectors of society quite dramatically. OECD nations, joined by India, China and others, will see an increase in 'nomad' or 'Bedouin' workers with skills in service, knowledge and ICT industries. Self-employed, or employed through specialist recruitment agencies, they will offer competitive, bespoke and flexible services. They will be able to work from home or on the move, visiting the office via video call and in person.

The flip side of this flexibility will be the emergence of new workers rights movements. These will of course be born through the Web, and will campaign for the right to 'switch off' and the right to privacy.

Despite all this blurring, many companies and organisations will retain the conventional office/workplace, valuing their role in fostering a community of ideas and action. The importance of face to face meetings and the camaraderie created by 'being there', will mean that the workplace will be more likely be replaced by 'workplace*s*' rather than disappear altogether. Communication and networking have already come to define a lot of what work in 'post industrial' societies in the mid-noughties is all about. Technology will not erode the place of face-to-face, interpersonal communication – it will simply achieve it through other media – video conference calls and multimedia streaming via developments in VoIP.

Widespread take up of Software as a Service (SaaS) – also currently known as on-demand or hosted applications – will have heralded Web conferencing technology. Real-time 'e-meetings', screen and application sharing, group

document mark-up, electronic white boards supplemented by multimedia and integrated VoIP, file sharing, remote control, archiving, media streaming and polling will all be the norm. SaaS will also have revolutionised work sectors such as supply chain management, often cutting out altogether the 'middleman'.

Recent research by Orange's Future Enterprise coalition and the Henley Centre has suggested four scenarios for the future of work in 2016.[47] *The way to work: space, place and technology in 2016* predicts that the next 10 years are likely to see significant changes in the way we work. The report suggests that one possibility is ICT being used to secure the current organisational structures of medium and large businesses with firm divisions between work and outside work, time and space. Alternatively, they suggest that the next 10 years may herald a decentralisation of work practices, aided by cheaper and more pervasive ICT.

A useful comparison is drawn with the cottage industries that defined work prior to the industrial revolution. In the West, knowledge economies will see the rise of 'fluid virtual team working', flexi-time and a blurring of work/home spaces. Online social networks will have flourished, to replace the 'community' previously created by gossip around the water cooler and cigarette break. Alternatively, mobile freelancers will be the archetypal employees of the future. This flexibility and individual customisation also means that the traditional employer/employee relationship becomes transformed.

Boundaries of organisation and geography will increasingly be overcome and employees will be competing for freelance project work on a global scale. This scenario is defined by employees' self determination, competition and

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[47] See:
http://www.business.orange.co.uk/servlet/Satellite?pagename=Business&c=OUKPage&cid=104413332605 7

an 'always on' work place. The final scenario which the report offers is one which is defined by the new networks that ICT, the Internet and Web are forging. Local economies will be strengthened by the very fact of the information sharing characterised by the ICT enabled global network. This world is:

> *"…one of producer-led and consumer co-operatives, membership organisations which are driven by the prospects of gaining leads for work or improved quality of service… work culture is highly entrepreneurial, the low costs involved in reaching customers mean that new companies are constantly coming into being."* [48]

4.3.1 Mobile work places

> *"…The future will not be mainly about the growth of home-working, but the expansion of mobile work."* [49]

So-called 'always on' connectivity will mean that we will have become even more used to our lives being defined by work. Mobile working practices are likely to grow steadily. As we have seen above, there may be a move to more individuals touting for work as 'consultants'. IT specialists with particular skills in developing business models could 'out-source' their skills to a number of companies, rather than being based at one and spending over half their time in work which does not mesh with their particular skill set, or more simply which doesn't interest them. They will become a distinct category in themselves, served by a proliferation of skill- and sector-specific recruitment agencies, based online of course. As in other spheres, diversity and individualism will become defining characteristics of the mobile work environment. Entrepreneurship will continue to thrive.

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[48] *The way to work*, ibid page 11

[49] *Tomorrow Project*: www.tomorrowproject.net

A shift to a market where value is placed on 'human capital', rather than ownership of 'fixed capital', will mean that the new economic elite will be characterised by skills and knowledge rather than ownership. This group, the *Tomorrow Project* [50] suggests, will:

> *"…need to work if they are to get an income from their human capital – their capabilities. Indeed, the more they work, the higher the income they get. As these people become increasingly numerous within the emerging knowledge economy, more and more workers with specialist skills will have an incentive to put in long hours. They will get high returns for their labour."*

Such flexible working styles will possibly allow a 'new' family unit to emerge, with either or both parents being able to stay at home in full-time childcare and full-time work. For those with work skills in ICT, IT, and 'knowledge', there will be an increasing trend, already starting today, to re-locate. IT and knowledge economy specialists will migrate from the cities in search of a better lifestyle. They will move to the South West, Wales and Western Scotland and further afield. They will be able to work 'remotely' – from previously 'remote' locales – manage their own work time and commute only when necessary.

4.4   The Web and Business

By 2020 we will have seen the rise of 'v-business'. Customers and employees in some sectors – IT and media for instance – may well be buying and working in virtual online businesses. At the same time, and alternatively, 2020 could well have witnessed the development of an alternative Web-based trade / barter economy which doesn't use cash, and where commodities and services have relative values.

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[50] A UK based independent research charity, the *Tomorrow Project* conducts research into our changing lives over the next 20 years. Available at: www.tomorrowproject.net

Current attempts at web-based barter/swap sites have been rather slow to take off. But we have already seen a heart warming precedent for this being set by the Canadian man who recently traded 'up' one red paper clip – by way of a novelty fish pen, generator and an afternoon with Alice Cooper among other things – for a house, all via his blog. [51]

Sites will allow people to swap time/expertise/things for other peoples' time/ expertise/things, eliminating cash from the transaction. This growth in an alternative economy will mesh with the ideals of the 're-locaters' previously mentioned. As a result new 'currencies' will have emerged, the result of a convergence of v / e-commerce, social networking and an increasingly de-centralised knowledge economy. Beyond personal and leisure uses, it is possible that the Web will facilitate further alternative economies involving volunteering, bartering skills, knowledge and opinion.

Recent research by the *Social Futures Observatory* has also suggested that the Web provides an ideal medium through which to return to one of the oldest forms of financial service: social lending. The report uses a case study of UK-based web based social lender: *Zopa* which allows people to lend and borrow money, by-passing banks whose investment practices and dependency on bad debt have increasingly been called into question. The authors of the report suggest that:

> *"Such newly emerging types of financial relationships may seriously rival more traditional mainstream financial services and prompt a need to re-examine the model of traditional banking..."[52]*

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[51] See: http://oneredpaperclip.blogspot.com/

[52] Hulme, M. K. & Wright, C. 2006. *Internet based social lending: past, present and future.* Social Futures Observatory. *Zopa* available at: http://www.zopa.com/ZopaWeb/

For businesses, software as a service (SaaS) will be the norm. This will involve outsourcing and streamlining everything from video conferencing to supply chain management. Currently, many businesses are opting for SaaS providers to implement customer relationship management (CRM) solutions, but 2020 will see SaaS solutions across a range of business areas – supply chain management, financial management, sourcing and procurement management and product lifestyle management. Current developments in bespoke software services are also likely to have gained widespread use, with collaborative browser-based user interfaces being the norm, particularly in smaller and medium sized businesses.

As a recent article in *Wired* noted: "Web 2.0 means different things to different people – but for small and midsized businesses its greatest impact could be in adapting the principles of hosted, lightweight and browser-based applications for heavy-duty data analysis on a par with big custom software platforms affordable until now by only a few".[53]

4.5 The Web and how we play

Currently, after email applications and the web as a 'library', the next most popular use of the Web is for entertainment purposes.[54] The technology underpinning current P2P games played in web browsers, such as *World of Warcraft*, will continue to push boundaries of speed, memory capacity and multimedia for all web applications. Though many 'residents' of *Second Life* may object to it being called a game, this kind of online community is likely to develop into something more substantial than a trend. As a "3D online digital world imagined, created and owned by its residents", *Second Life* is

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[53] DuVander, A "The business side of Web 2.0" *Wired.com* 13.11.2006

[54] An Internet Study conducted by Stanford University back in 2000 found that email was by far the most common internet use. It found that a third of all internet users consulted in its poll of 4000 respondents, used the Web for accessing entertainment. (Available at: www.stanford.edu)

sociologically speaking something different from an online or role playing game – not least because you are obliged to carry out the more prosaic and banal aspects of 'living'. Crucially, it also allows resident avatars to own the intellectual property rights to their online creations, and make a buck: "You create it, you own it – and it's yours to do with as you please".[55] It is in these senses that it is less thoroughly escapist than an 'ordinary' game. Although it may be easy to be sceptical about the current hype surrounding *Second Life*, its monthly newsletter "Second Opinion" for November 2006 reported that:

> *"Second Life achieved a major milestone this past month as we reached our millionth registration. Over two hundred thousand accounts have been created in the last two weeks alone. Premium membership soared nearly 20%, and thousands of new basic accounts were opened around the world, with 50% increases in people arriving from Turkey, India, Portugal, Israel, China, Singapore, Columbia, Hungary, Romania, Malaysia, Philippines, Hong Kong, Peru, Chile, Croatia, and Taiwan, among others.*

> *As exciting as it has been to welcome so many new people and see how the world is transforming before our eyes, there have of course also been some growing pains. The Orientation Islands are full. Volunteers from the Mentor and Live Help groups are challenged to keep up with the influx. Our Linden staff strives to answer as many questions as possible and to maintain a dialog, but at times there is only time to listen and not always time to respond immediately."[56]*

Second Life's homepage showed that as of 13th November 2006, there were 1,377,717 residents,[57] roughly equating to the entire population of Northern

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[55] See: http://secondlife.com/whatis/ip_rights.php

[56] Available at: http://secondlife.com/newsletter/2006_11/

[57] Interestingly though, out of those million plus residents, a little over a half had logged in the previous 30 days.

Ireland. Out of these residents, 7,460 were currently online and in the previous 24 hours, US$ 580,750 had been spent – a not insubstantial flash in the pan…

Less literally, the Web will continue to change the way we consume different media. We are increasingly seeing a situation where we can watch, listen and read on-demand. MP3 download sites, iTunes, Podcasts, internet radio and television mean that conventional broadcast media schedules increasingly no longer matter. As mentioned earlier, Channel 4 have recently announced that they are to provide all their UK-produced programmes on the Internet in a pay-per-view format. There is little doubt that the future of TV and radio is likely to be revolutionised by Internet based distribution. Generation "C" are paving the way for a future where most of our media consumption can, and is, done on the move and at viewers' and listeners' bequest. Portable media players will increasingly allow teenagers, and every other age group, to watch and listen to what they want, when they want.

In March of this year, a survey conducted by Google and reported in The *Guardian*[58] suggested that the average Briton spends 164 minutes online everyday, compared with 148 minutes watching TV. Beyond work and sleep, we are now spending more time on the Web than any 'where' else it seems. This likely to grow further. Increases in bandwidth and broadband connections have opened up new possibilities. Live streaming of visual and audio media are now accessible in real time. Internet Protocol Television (IPTV) is one of the widely tipped emerging technologies which will allow mass roll out of internet TV.

The success of YouTube also provides a glimpse into the future role of the web in entertainment, where consumers are recasting themselves as 'prosumers'. Posting home videos, blogging and the rise of the citizen-

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[58] Johnson, B "Britain turns off – and logs on". The *Guardian.* 13/11/2006

journalist are all radically altering the way media – whose production has traditionally been held in the hands of the few; film moguls, newspaper editors, programme commissioners – is produced and consumed. The BBC's pre-eminent online news website, with its podcasts, journalist blogs and 'listen and watch again' options, is, because of its public service broadcasting remit obliged to be at the head of the game.

Personalised, customised 'culture' and consumption of culture will characterise Web use for entertainment purposes in 2020. Kevin Kelly writing in Wired in 2005 suggests that:

> *"…The web continues to evolve from a world ruled by mass media and mass audiences to one ruled by messy media and messy participation. How far can this frenzy of creativity go? Encouraged by Web enable sales, 175,00 books were published and more than 30,000 music albums were released in the US last year. At the same time, 14 million blogs launched worldwide. All these numbers are escalating. A simple extrapolation suggests that in the near future, everyone alive will (on average) write a song, author a book, make a video, craft a weblog, and code a program. This idea is less outrageous than the notion 150 years ago that someday everyone would write a letter or take a photograph…"*[59]

The level of participation defining the current Web 2.0 era looks set to define the future development of the Web, and the kind of entertainment applications which will develop.

4.6   The Web and how we shop

Like the way we consume mass media, the web has also already started to revolutionise the way we shop. Groceries, clothing, music, flights, out of print

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[59] Kelly, K. 2005. "We are the web." On: *wired.com*. 13.08. August 2005.

books, skills and services of all kinds are bought and sold through the Web. The ethos behind eBay based on a moral economy of trust and reputation as well as cash will continue to shape our v / e-commerce experiences, as perhaps will the rise in 'social shopping' sites such as Crowdstorm. It is estimated that half a million people make a living selling through internet auctions – a global flea market whose "…chief method of ensuring fairness is a system of user-generated ratings..." [60]

By 2020 v-commerce will replace e-commerce, with 3D virtual equivalents of high street stores. This is being pioneered currently in *Second Life* by the leisure wear company, *American Apparel*. [61] Importantly however, the high street will not have become obsolete, shopping is a leisure activity which people enjoy: its tangible sensory aspects, feeling a sweater, trying on shoes, meeting up with friends for lunch are more important than the bare bones of transaction.

'Minority Report' style responsive billboard advertising, and certainly 'customised' advertising to personal handhelds, computers, and Internet TVs, will have resulted in a mass personalisation and diversification of advertising and marketing.

In the West, the lifestyle trend toward buying locally and seeking the 'authentic', 'organic' and 'fair trade' option will have forced a lot of businesses to re-organise their supply chains, branding, marketing and products sold. As in other areas of life online, the way we shop on the Web in 2020 will be characterised by personalisation and customisation and an increasing, somewhat ironic, search – by those with the material means – for the 'real' and 'authentic'.

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[60] Kelly, K. 2005. op cit

[61] A Los Angeles based clothing company practising 'vertically integrated manufacturing', the opposite of outsourcing, launched its *Second Life* store in June 2006, allowing residents to kit out their avatars in T-shirts from 'real life'.

We predict that there will be a shift, as highlighted in the 'how we will work' section, in the ways in which we buy services for personal, domestic and commercial purposes. Online recruitment agencies for individuals with particular skills, whether they be plumbers, coders, photographers or journalists, will tout for our business. Amazon's 'people who bought this book also bought…' function, involving 'collaborative filtering', will form the basis for new forms of personalised advertising. Andy Clark writes about this automatic knowledge pooling – in this case of customers CD purchases on Amazon – in *Natural Born Cyborgs* occurring sometime before the mass popularity of folksonomies such as del.icio.us. 'Traditional' forms of categorisation – what humans do to organise and give meaning to anything from food to music genres – is undergoing a quiet revolution. The collective 'tracks and trails' left by online consumers, and collected by data miners, through the course of their shopping means the end of pigeon-holed marketing:

> *"Those collective tracks and trails have the great advantage of sidestepping all the simplistic categories that we human beings use to classify our own choices … Categorization, by cumulative trail laying, is unplanned, emergent and as flexible as consumer choice itself..."* [62]

This sense of 'emergent' information, produced as a result of the trails we leave when browsing the Web, is something which forms the basis of the suggestion that the Web will spontaneously spawn the first artificial intelligence – what Ray Kurzweil calls the 'Singularity' and Kevin Kelly 'The Machine':

> *"This gargantuan Machine already exists in a primitive form. In the coming decade it will evolve into an integral extension not only of our senses and bodies but our minds…the Machine is fractal. In total, it*

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[62] Clark, A 2003. op cit

harnesses a quintillion transistors, expanding its complexity beyond that of a biological brain. It has already surpassed the 20-petahertz threshold for potential intelligence as calculated by Ray Kurzweil. For this reason some researchers pursuing artificial intelligence have switched their bets to the Net as the computer most likely to think first... " [63]

But what about the ways in which we think, and the ways we think about and use this technology – (how) will this have changed by 2020?

4.7   The Web, ICT and how we think

By 2020 Life online will have changed the way we think… imperceptibly. Like the pen and paper, technologies and the gadgets which provide interfaces to 'always on' connectivity will increasingly become 'norms'. We will take these 'transparent' technologies for granted – their use will become 'second nature' and, in some cases, 'extensions' of our bodies. 'Connecting' will no longer be a conscious act.

The cognitive scientist Andy Clark, Chair of Logic and Metaphysics at Edinburgh University, has written extensively on bio-technology syntheses, most notably in *Natural Born Cyborgs.*[64] His suggestion is that the human mind and human beings are 'plastic' and adaptable, able to include technologies such as cell phones very quickly and integrating them as 'parts of themselves'. Clark gives the example of Finland, where the colloquial term for a mobile phone is "kanny" translating as "extension of the hand". The small neural differences which open humans up to swift adaptation to tool/technology-based extensions, or 'mindware upgrades', (and of course the

[63] Kevin, K. 2005. 'We are the web'. Wired.com 13.08 August 2005.

[64] Clark, A 2003. op cit

ability to invent and make them) is what defines us as distinct from other species.

It is Clark's contention that:*"it is our basic human nature to annex, exploit and incorporate nonbiological stuff deep into our mental profiles."* He argues that to dwell on the notion of post-humanity or the cyborg future is to misunderstand the way our brains work with tools. Clark argues that the brain extends way beyond the 'biological skin-bag', encompassing a range of props, tools and aids to cognition which we all use, including language, cultural artefacts, post-it notes, personal organisers and other people. Thus: "*The brain is poised for profound mergers with surrounding symbols, cultural artefacts and technology."* This is, indeed, the very basis of human nature. Understanding this enables us to make the best use of the developing technological world, rather than to be dominated or swamped by it.

> *"We are already masters at incorporating nonbiological stuff and structure deep into our physical and cognitive routines. To appreciate this is to cease to believe in any post-human future and to resist the temptation to define ourselves in brutal opposition to the very worlds in which so many of us now live, love and work."*

Collaborative tracking and our personalised 'netizen' profiles – the ever changing typology of 'who we are' according to what we buy and where we go – will result in the Web becoming our memory.

Already, by posting pictures on Flickr, writing our blogs on Blogger and adding to Wikipedia, we – or some of us – are unconsciously writing the software of the future that will enable the Web to become our memory. The cross referencing in which our brains engage to remember things is being mirrored and mapped on the Web, from Wikipedia's links to del.icio.us's tagging. As Kevin Kelly suggests:

"…We think we are merely wasting time when we surf mindlessly or blog an item, but each time we click a link we strengthen a node somewhere in the Web OS (Operating System) *thereby programming the Machine by using it…What will most surprise us is how dependent we will be on what the Machine knows – about us and about what we want to know. We already find it easier to Google something a second or third time rather than remember it ourselves. The more we teach this megacomputer, the more it will assume responsibility for our knowing. It will become our memory. Then it will become our identity. In 2015 many people, when divorced from the Machine, won't feel like themselves – as if they've had a lobotomy."* [65]

The very nature of "knowledge" and "information" and how they are produced and consumed is changing. Understanding how we construct and use the tools that comprise the Web, how we adapt to them and adapt them into our lives and into our cognitive processes, will enable us to understand how best to respond to the challenges posed by new technologies.

4.8 The Web and how we experience time, space, place and landscape

Technologies allowing seamless mobility: convergence and IP Multimedia subsystems and others will have brought about further blurring of the 'real' and the 'digital'. Mobile communications, video messaging and video calls will allow us to be *present* while actually being physically *absent.* This will have changed our experience of private and public space and *time.*

'Glocalisation' engendered by 'always on' connectivity will see local differences persist and flourish, serviced by global internet architectures, and a social awareness of the world beyond our everyday environment. Individual

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[65] Kevin, K. 2005. "We are the web". Wired.com 13.08 August 2005.

customisation of services will 'follow' us through different spaces, while the technology itself will be characterised by decentralisation (the Web has no centre) and diversification (distributed P2P processing).

Rheingold among others, has charted in detail the potential future for a blurring of the perceptual boundaries we currently draw between the physical and the virtual or digital. ICT will increasingly not only be completely mobile but also *in situ* in our environments. Information is likely to be *in* places, tagged as digital 'Post its' or floating digitised text messages. Public spaces, work and home will not only be WiFi connected but will increasingly act as 'interfaces'.

This blurring has already, almost imperceptibly, started to occur:

> *"…Smart mob technologies already seem to be changing some people's sense of place as well as their experience of time, with visible effects on public spaces such as sidewalks, parks, squares and markets, where more and more of the physically co-present population are communicating with people far away".*[66]

Rheingold cites the vision of IBM researcher Jim Spohrer and his 1996 proposal for a WorldBoard allowing information to be available in context, overlaid on the 'real world'. This has the potential to mean:

> *"…a planetary chalkboard for twenty-first-century learners, allowing them to post and read messages associated with any place on the planet…It is not hard to imagine a server computer storing information associated with every cubic meter of the earth's surface; computer memory is cheap. Geographic positioning systems could make handheld or wearable devices location-aware. Wireless Internet access*

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[66] Rheingold (2002) op cit, page 195

> *would mean that a user could access the server computer and or receive information about specific geographic locations."*[67]

4.9 The web and cyberlaw

This is currently one of the most controversial issues concerning the Web. The year 2020 is likely to have heralded a new era – one defined either by regulation, or by a preservation of the Web as a 'commons'; as an 'agora' with free rights of access to all, or some combination of the two. Privacy, Security and IP (intellectual property) issues are likely to have been legislated for. We suggest that large and mid-sized businesses will remain the best 'policer' of the Web and that spam and virus secure Intranets/webs for large multinationals and governments will have been developed and improved.

The current debates around these issues and their outcome will have a significant influence on the future of the Web. Proponents for 'network neutrality' want to ensure that the ideologies of free speech and open access on the Web are retained. They fear a Web that is increasingly governed by a world of 'walled gardens', where big business interests favour some content and services (their own) over others. On the other hand, critics of a network neutrality policy, itself a form of regulation, argue that it would undermine the competition that has propelled technological developments such as broadband.

Lawrence Lessig, Stanford professor and renowned 'cyber' lawyer (who took on Microsoft, and lost) first designed and taught a course on 'Law and Cyberspace' at Yale in 1995. An early thinker on the complexities of law in cyberspace, he was keen to work beyond the then existing and perhaps rather naïve belief that the Internet was 'programmed' to see censorship as 'damage' and to find routes around it. His is a complex position, predicting the hard line that big business interests would take on the innovations in

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[67] Rheingold (2002) op cit, page 92

information-sharing that the Web facilitated. Napster is just one example, where the monoliths of the music industry moved to stifle potential innovation. Lessig's global *Creative Commons* initiative is aiming to build in more flexibility to copyright law on the Internet.

The *Creative Commons*[68] aims to forge a middle ground between the extremes of copyright control (© "all rights reserved") and un-fettered exploitation of intellectual property. It uses new copyright licences allowing more nuanced control of work. Examples include **Attribution,** where you allow others to copy, distribute, display and perform your copyrighted work and derivatives, but only if they give credit the way you request. **Non-commercial,** where you let others copy, distribute, display and perform your work and derivatives, but only for non-commercial purposes. **No derivative works,** where you let others copy, distribute, display and perform only verbatim copies of your work, and no derivatives. **Share alike,** where you allow others to distribute derivative works only under a license identical to the license that governs your work.

This nuanced approach to intellectual and creative property rights is likely to pave the way for future approaches to ownership of – from the 'creative' industries at least – web content.

4.10 The Web and politics

The Web has the potential to provide an interactive, collaborative and discursive medium through which to revolutionise political debate and the democratic process more broadly. We suggest, somewhat idealistically, that by 2020 public consultation exercises will routinely be carried out via the Web. A new Government Department tasked with gathering and fostering public opinion from the Web will have been established.

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[68] See: http://creativecommons.org

The French referendum on the EU Constitution, held back in June 2005 was one of the first occasions where the power of the 'blogsphere' was seen in full force. A law teacher from Marseille led the Web-based 'Non' campaign. The BBC reported that in the days before the final vote his blog was receiving 25,000 hits per day. Although it is difficult to apportion the outcome of the referendum to this 'No' campaign, the grassroots power of blogs as a means of fostering engagement in political debate with a much wider audience was certainly made clear.[69] At a time when political engagement and faith in current systems of elective representative democracy are unarguably on the wane, the Web is providing a renewed forum for political involvement, protest and representation, on both national and global levels. Recent campaigns such as Make Poverty History, part of the international coalition Global Call to Action Against Poverty (GCAP) use their websites as forums through which to organise, co-ordinate and mobilise action and protest. Similarly, Howard Rheingold gives the example of "People Power II" the smart mobs in Manila, who in 2001 overthrew the presidency of President Estrada through coordinating mass demonstrations through forwarded text messages.[70] So called citizen-journalists and increased web based activism will be the new routes for political engagement and protest. Recent research by the University of Southern California's Center for the Digital Future not only found that 43% of Internet users who are members of online communities say they "feel as strongly" about their virtual communities as their 'real' world communities, but also that participation in online communities leads to increased social activism.[71] However, at the same time the Centre's research suggested that the American public are wary about the

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[69] Anderson, K. *Bloggers take on European elites.* 02.06.2006. Story from BBC NEWS, available at: http://news.bbc.co.uk/go/pr/fr/-/1/hi/world/europe/4603883.stm

[70] Rheingold, H. 2002. *Smart Mobs: The next social revolution.* Cambridge MA: Basic Books. Page xvii

[71] Source: *Online world as important to Internet use as real world?* USC Center for the Digital Future, available at: http://www.digitalcenter.org/pdf/2007-Digital-Future-Report-Press-Release-112906.pdf

Web providing a medium through which to have more say in the political process.

Despite the above contradictions, we suggest that by 2020 online voting will have been tried and tested. After initial teething problems it is likely to be the vote-casting method of choice in elections. This will have increased turn out figures, but is likely to be embroiled in controversy, from vote-buying scandals to contributing to the rise of 'netizens'. These citizen-consumers par excellence will organise themselves into consumer and minority interest advocacy groups.

Today, online petitions, consultation exercises and the like have already pointed toward the potential future of the web as a tool in governance, debate and public engagement. Sites from McDonalds to Lego to New Labour, have opened up pages for citizen-consumer feedback on product lines. Indeed, in October UKIP – jumping on the online community bandwagon – became the first political party to launch a branch in *Second Life.* Elsewhere, the US-based site iPetitions allows Web users to host thousands of campaigns, from 'Bring Becks Back!' to 'Give 16 year olds the vote'. The site has thousands of petitions which it states:

> *"…allows you to use the power of the internet to promote your
> favourite cause. You also become part of a vibrant community of civic-
> minded internet activists. Join the conversation at our discussion
> groups: share your thoughts on internet activism, online politics, and
> ways to use the internet to change the world."* [72]

This current bandwagon perhaps points to a deeper potential sea-change in public engagement with the political process. It is likely that the Web will increasingly be used as a media for organising protest and activism (see 'Web

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[72] See: http://www.ipetitions.com/view.html

tribes' and 'Smart Mobs' above). But it will be 'activism' dominated and led first by the citizen-consumer 'Netizens' of post-industrial societies. This tech-savvy, consumer-led 'activism' will be born through price comparison sites such as kelkoo, and will potentially be more concerned about not getting ripped off than in fostering global peace.

Elsewhere, international organisations and meetings such as the Internet Government Forum (UN-sanctioned) are being established in an attempt to regulate this kind of activity on the internet, presenting a potential institution-led alternative to the 'user-led' growth of the internet in recent years.

A recent article in *Wired* suggests that the Web represents *the* arena for the future for politics, democracy and engagement. Jennifer Granick points to the US Federal Funding Accountability and Transparency Act which will soon list the US government's grants and contracts on the Web, to show tax payers money is being spent. The Web – and particularly Web 2.0 tech developments in distributed processing and file sharing – she argues can be a tool for bringing true transparency to the machinations of national and local government, helping to make government and the democratic process responsive and to give citizens a sense of empowerment.[73]

4.11 The web and sustainability.

The web has already had a large impact on the ways in which we use natural resources. The rise of email alone has led to a significant reduction in the amount of paper being shifted around the planet. Large reports, which once would have required substantial amounts of energy to deliver by post or courier, are now more commonly sent as email attachments. While these still require energy to be printed by the recipients, the savings in packaging materials and fuel are significant. The demise of the letter, complete with envelope and stamp, while bemoaned by some who see it as reducing even

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[73] Jennifer Granick. 'Saving democracy with Web 2.0' wired.com 25/10/2006

further the standards of literacy, should similarly be welcomed by conservationists.

The speed of electronic communication that the Internet has also reduced, at least theoretically, the need for people to travel to meetings – sometimes at the other side of the planet. Microsoft's *NetMeeting* software, for example, can allow any two people with cheap web cams to communicate face-to-face. More sophisticated technology enables widely spread groups of people to discuss issues of mutual concern without leaving their own office buildings. Some may argue that this is not quite the same as being in one room with each other, and they have a point. But in an age when not only time-saving but also energy-saving is of significant concern, such 'quibbles', we predict, will increasingly be brushed aside.

In addition to these 'green' credentials of the Internet today, we predict further developments in this area in the near future, leading to very significant savings in energy use by 2020. The two principal areas in which these advances will occur are in 'green energy' running the Internet (hosting companies providing 'clean' energy guarantees) and, concurrently, the rise of what a *Wired* article has called 'The Energy Web'. Both have the potential to make the Internet, Web and other applications more 'sustainable' and more cost effective for businesses and end users.

The rise of the knowledge economy and ICT's role in this has been heralded as having the potential to provide alternative economic models, in line with sustainability targets. Professor of Environmental Sustainability and Technology Management at Madrid's *Instituto de Empresa*, Gregory Unruh, suggests that:

> "…the Internet provides holds the potential for increasing the efficient use of resources, like energy, water and forests. And as a network

> *technology the Internet opens multiple avenues to improve the*
> *efficiency of commercial systems and the elimination of waste." [74]*

Unruh also stresses that online e-commerce is much less energy-guzzling than high street equivalents. He argues that the energy use (supply chain management, transportation etc.) per book sold in a high street bookshop, for example, is 16 times more energy intensive than a book sold through Amazon. A 1999 OECD study also found that e-commerce could eliminate the need for 12.5% of retail building space. Unruh suggests:

> *"…Even larger gains are to be had with products that can be digitised*
> *and delivered entirely online, like software, music, entertainment, and*
> *some consulting services."*

This trend will, we predict, gain even greater momentum, not only because of the increasing sense of environmental responsibility but also because of its cost effectiveness. If being green is the cheaper alternative, the choice becomes a no brainer.

The Internet, of course, still needs energy in order to run, and electrical power generation currently contributes very significantly to carbon emissions. Hosting and data centres that form the hubs through which the world wide web functions similarly require substantial amounts of energy to build, maintain and operate. They may be invisible to the surfer at his or her desktop computer, but they are certainly there, along with the power stations that supply them.

Two developments in this area are already evident and will undoubtedly develop in scale over the next few years. The first involves a reduction in the 'carbon footprint' of web services. At one level this takes the form of more energy-efficient servers using, for example, a new generation of processors

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[74] *Can the Internet help slow down global environmental decline?* Available at: www.firstmonday.org

and associated technologies. The AMD *Opteron*, for example, can function, it is claimed, using 60% less energy than previous generations of core processors and producing 50% less heat. Loweing the amount of energy required to keep server installations cool results in further 'green' gains.

Elsewhere, hosting companies are turning to alternative energy sources – solar panels, wind turbines and the like – with which to power their businesses. In this way they have a significant market appeal to users, whether individuals or companies, seeking to enhance their own sense of green credibility and responsibility – a strong motivation that will be an even more significant driver by 2020.

The second way of countering the Internet's potentially adverse impact on the environment is by 'offsetting' its contribution to emissions. We are increasingly familiar with this approach in the context of, for example, air travel. We can now calculate how many trees need to be planted in order to absorb the emissions of a flight from London to New York, and the specific 'fee' that we as individuals should contribute in order to be carbon neutral. A new industry of 'offsetters' has already sprung up, with appealing names such as 'My Climate' and 'Atmosfair'. They will undertake to plant the trees for you and provide you with a certificate of your environmentally sound status.

There are cynics who dismiss such innovations as unproductive gimmicks that contribute little or nothing to the 'real world' of the environment and climate change.[75] Others, however, seek to 'do what they can' in this context and they will increasingly influence the way in which Internet businesses, including ISPs and server hosting companies, manage energy-related issues. 'Eco-hosting', involving a combination of reduced energy consumption, alternative energy sources and offsetting, will gain a very significant share of the market by 2020.

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[75] See, for example, Bjorn Lomborg (2001) *The Skeptical Environmentalist*, Cambridge University Press

4.12 The Web in 2020: truly global?

The digital divide, both national and international still means that over 80% of the world's population do not have internet access.[76] Business Week recently reported that:

> "*…of the 1 billion Internet users, 81% reside in 20 of the roughly 240 countries and territories worldwide. The U.S. comprises 4.6% of the total world population, and Internet penetration here stands at roughly 69%. By contrast, Africa's population accounts for a little more than 14% of the world, but only roughly 3% of that continent's people have access to the Internet. In South Asia, where more than half of the world's population lives, Internet access stands at 8.9%.*" [77]

Internet penetration in India is currently at 5.4%, in China at 9.4% and across the African continent at a total 3.6%, although Liberia has only 0.03% penetration. Growth rates are another matter. From 2000 to 2006 growth in India has increased by 1100%, in China 446.7% and in Liberia 100%. [78] At the same time a quite startling statistic was cited by Natasha Primo, head of the NGO Women'sNet, at the recent UN Internet Governance Forum held in Athens. "*…even Africa's most well-endowed centers of excellence have less bandwidth than a home broadband user in North America or Europe, and it must be shared among hundreds, even thousands of users*" [79]

- The global Digital Divide – will it grow wider?

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[76] Referenced from 'Using Tech to fight terror' Wendy Haig. *Business Week online.* 7th November 2006.

[77] Source:
http://www.businessweek.com/technology/content/nov2006/tc20061107_919383.htm?chan=innovation_innovation+%2B+design_top+stories

[78] Source: http://www.internetworldstats.com/stats.htm

[79] Transcript of Natasha Primo's keynote address to the Internet Governance Forum available at:
http://www.intgovforum.org/IGF-OpeningSession-301006.txt

- Will we see calls for Web access as a democratic right?

Just as sociological analysis of the institutions and processes of 'real' life shows that people are excluded from benefits, decision making and opportunity by way of socio-economic status, ethnicity, disability, geographical location, so are potential Web users. Important questions include:

- Will there remain a low income marginal population, mostly in sub-Saharan Africa and South America, which will only be able to gain access to limited ICT services?

- Or will, as our own observations from Cambodia to Albania indicate, ICT infrastructures 'leapfrog' the traditional industrial development pattern recognised in post-industrial societies? [80]

One area in which it is possible to predict what the issues around exclusion might look like in 2020 is the kinds of interface that people will be using to access the Web. Current estimates suggest that there are 2.14 billion mobile phone subscribers across the globe, and the World Bank has estimated that over two thirds of the world's population currently live within range of a mobile phone network. The year 2020 is likely to see 100% network coverage. Recent research commissioned by *Vodafone[81]* conducted in Egypt, Tanzania and South Africa has suggested that rapid growth in mobile communication services is filling infrastructure 'gaps', acting as a "leap frog technology". Equipped with 3G capabilities, these have the potential to bring Internet access to those people who are currently the hardest to reach and

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[80] Kevin Kelly – founding editor of *Wired*, as well as the *Whole Earth Review* and involved in the foundation of the *WELL*, the first 'online community' – suggests not. He gives often cited examples from the developing world (satellite TV, mobile phones) as examples of *gadgets* rather than technological infrastructure.

[81] Reference: *Impact of mobile phones in the developing world.* Available at: www.**vodafone**.com/**africa**

'connect'. In 2020 we might expect to see (g)local content and local services using the global architecture of the Internet to service glocal Web applications, with unevenly distributed access.

Leftist socio-economics underpinned decisions by the Brazilian government and businesses to back 'open-source' or free software such as Linux. This has been spearheaded by Gilberto Gil, not only one of Brazil's most well known musicians, but also Minister for Culture and a proponent of his country's moves to create a cyber-culture defined by the ideologies of the open source movement. In many senses this government-led initiative is aimed at structuring the communitarian ideals of early Web pioneers in the ICT infrastructure of a whole country.

The path that Brazil is forging may well pave the way for other nations in the developing world and allow them to swing the future of Web regulation in the direction of the open source. India also has a powerful open source lobby. On the other hand, of course, there is the widely reported censorship and regulation of web content and access occurring in China and, most extremely, in North Korea – an 'Internet black hole'. The geopolitics of 2020 will increasingly be drawn around new currencies of knowledge and content, accessed and exchanged through the Web.

4.12.1 Language and culture

It is all too easy to consider Google, Wikipedia, and MySpace as equally popular across the globe. One needs only to look to Asia for contrary examples. Yahoo!, rather than Google, is the most widely used search engine in Japan, Taiwan and Singapore. In the birth place of identity politics, BlackPlanet and MiGente are US-based social networking sites specifically for African-Americans and Hispanic, with 14,861,131 and 2,488,954 members respectively. The 'flattening' aspects of the Web are much talked about but we predict that the Web is much most likely to proliferate along lines of decentralisation, difference and diversity, characterised by all manner

of 'identities'. Indeed, a key issue under discussion at the recent Internet Governance Forum was the need to keep the Web multilingual as a way of safeguarding future access for all.

Elsewhere, so-called 'closed community' sites such as Beautiful People.com provide examples of a not so egalitarian application of the social networking ethos. Its founder, quoted on the BBC News 24 programme *Click*, suggested that:

> *"…It is not just, as you'd expect, a dating site. It's become a site where people will help each other find apartments, find work, they have sensational parties."* [82]

4.13 The Web: Resistance and the rise of 'retro-luddites' and 'life hacks'

The disconcerting flip side to a continued Digital Divide is, of course, the predicted trend of people opting out of being connected to an 'always on' society.

A 'Technophobe / Luddite-by-choice movement will have grown into a substantial alternative community by 2020. It will be led first, as always, by the privileged cosmopolitan middle classes seeking self-improvement and a better quality of life.

Arguments over threats to liberty by way of technological developments tend toward the realm of conspiracy theory. But given the potential for new technologies to change the nature of surveillance, it is a significant area. The question of freedom of speech on the Internet, is also very much a live issue, and is likely to continue to be so.

In a less extreme form, people and websites will have fine-tuned the process of navigating information available online, favouring simplicity, functionality

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[82] Available at: newsvote.bbc.co.uk

and personalisation. So-called 'Life Hacks', wanting pared down functionality, will become a more significant demographic group than 'retro-luddites'.

The term *Life Hack* was coined by Danny O'Brien, a technology writer who inaugurated the phenomenon with a 2004 talk at the O'Reilly Emerging Technology conference: *Life Hacks – Tech Secrets of Overprolific Alpha Geeks*.[83] The idea stemmed from observing the habits of software programmers and engineers and the simple tricks they used to avoid drowning in a mass of digital information. Many would resort to 'secret software' – personalised scripts to simplify tasks – or would attempt to simplify life generally by, for example, controlling e-mail alerts or organising personal contacts.

The idea of the life hack has expanded beyond software, however, into any simple and specific labour and time-saving trick. Life hacking websites (of which there are many) include tips on how to fold a shirt more quickly, how to spend less time in the shower and how to set up a personal alert page to let people know what you are up to.

5   Summary

The Web in 2020 will be technically pervasive. We will increasingly access it through hand held devices. It will continue to facilitate our need to connect, exchange, compete and network: to allow us (or some of us at least) to know that we are not alone.

> *"…in order to feel the greatest sense of communication, to realize the most experience, as opposed to information, I want to be able to completely interact with the consciousness that's trying to communicate*

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[83] See: http://conferences.oreillynet.com/cs/et2004/view/e_sess/4802

with mine. Rapidly. And in the sense that we are now creating a space in which the people of the planet can have that kind of communication relationship, I think we're moving away from information – through information, actually – and back toward experience"[84]

Generation C will be grown up, tech-social savvy and be pioneering new ways for us to connect with the like minded. Culture, its production and consumption will be in a myriad of forms. Work, particular in the 'knowledge-based' industries will become ever more ICT dependent. More prosaically, our fridges will shop for us via the Web.

Web 2020 and the way we work, do business and shop

- OECD nations, along with China and India and others, will see an increase in 'nomad' or 'Bedouin' workers with skills in service, knowledge and ICT industries

- There will be a further blurring of the spatial and temporal boundaries of work, home and travel

- A new worker rights movements will be born, through the Web of course, campaigning for the right to 'switch off', and the right to privacy

- Many companies and organisations will retain the conventional office/workplace, valuing their role in fostering a community of ideas and action

- The rise of 'v-business' – customers and employees may well be buying and working in virtual online businesses

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[84] John Berry Barlow 1995 in: 'What are we doing online?' *Harper's Magazine*. 291:1743, page 35

- By 2020 we could well have witnessed the development of an alternative trade/barter economy on the Web which doesn't use cash, and where commodities and services have relative values

- V-commerce will replace e-commerce, with 3D virtual equivalents of high street stores…

- …Although the high street will not have become obsolete, shopping is a leisure activity which people enjoy: its tangible aspects, feeling a sweater, trying on shoes, meeting up with friends for lunch

- In the West, the lifestyle trend toward buying locally and seeking the 'authentic', 'organic' and 'fair trade' option will have forced a lot of businesses to re-organise their supply chains, branding, marketing and products sold

- 'Minority Report' style responsive billboard advertising, and certainly 'customised' advertising to personal handhelds, computers, and Internet TVs, will have resulted in a mass personalisation and diversification of advertising and marketing

Web 2020 and the way we think, act and perceive time, space and ourselves

- Life online will have changed the way we think… imperceptibly

- Like the pen and paper, technologies and the gadgets which provide interfaces to 'always on' connectivity will become 'norms'. We will take these 'transparent' technologies for granted – their use will become 'second nature' and, in some cases, 'extensions' of our bodies

- Collaborative tracking and our personalised 'netizen' profiles – the ever changing typology of 'who we are' according to what we buy and where we go – will result in the Web becoming our memory

- Technologies allowing seamless mobility: convergence and IP Multimedia subsystems bring about a blurring of the 'real' and the 'digital'. This is already happening

- Mobile communications, video messaging and video calls allow us to be *present* while actually being physically *absent*

- Our experience of private and public space and *time* will have changed

- 'Glocalisation' engendered by 'always on' connectivity will see local differences persist and flourish, serviced by global internet architectures, and a social awareness of the world beyond our everyday environment

- 'Life Hacks', wanting pared down functionality, will become a more significant demographic group than 'retro-luddites'

Web 2020, governance and regulation

- A combination of big business and increasingly governments and NGO's will work to 'police' the Web, on national and global levels

- Spam and virus secure Intranets/webs for large multinationals and governments will have been developed and improved

- Issues of privacy, security and IP will be the subject of the most legislation

- Public consultation exercises will routinely be carried out via the Web. A new Government Department tasked with gathering and fostering public opinion from the Web will have been established

- Online voting will have been tried and tested. After initial teething problems it is likely to be the vote-casting method of choice in elections. This will have increased turn out figures, but is likely to be embroiled in controversy, from vote-buying scandals to contributing to the rise of…

- … 'Netizens' on the Web, will organise themselves into consumer and minority interest advocacy groups

- Local content and local services will continue using the global architecture of the Internet to service 'glocal' Web applications

6   Technological analysis: Not if but when …

Artificial Intelligence pioneer, Ray Kurzweil argues that the exponential rate of technological developments over the last 100 years means that the next 20 years of progress will be equivalent to that of the entire twentieth century. [85] Alternative forecasts suggest that technological progress is near saturation point, with lack of widespread infrastructure limiting continued unhindered growth until alternative tech solutions (predominantly in light/optics and nanotech sciences) are developed and rolled out commercially.

Elsewhere it is the role of *Wired* and others to talk about a 'flattening of the world'. The availability of high-speed, wireless connections will increase rapidly over the next decade, while costs will reduce, allowing access to a larger percentage of low-income users and users in developing countries. While this might empower previously disadvantaged and otherwise marginalised groups, it cannot rule out the powerful interests of large

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[85] Influenced by Vernor Vinge, he also posits that by 2045 we will have witnessed technological development so immense that an artificial intelligence superseding human intelligence will have emerged. Kurzweil, R. 2005 *The Singularity is near: when humans transcend biology.* Viking Books. Sometime beyond 2020 we are likely to see a world where the "…evolutionary convergence of electronics and optics: 3-D and even holographic memory cells; lasers inscribed on the tops of chips, replacing copper pins with streams of photons; and all-optical networks in which thousands of colors of light travel along a single fiber. As these advances find their way into an increasing variety of devices, the petascale computer will shrink from a dinosaur to a teleputer – the successor to today's handhelds – in your ear or in your single path. It will access a variety of searches and servers, enabling participation in metaverses beyond the ken of even Ray Kurzweil's prophetic imagination. Moreover, it will link to trillions of sensors around the globe, giving it a constant knowledge of the physical state of the world, from traffic conditions to the workings of your own biomachine…" George Gilder. 'The Information Factories'. Wired Online. 14 October 2006

corporate and government stakeholders. The major barriers to global ICT roll-out are political and economic, not technological.

Otherwise, national and demography-specific trends in the public's take up will remain a limiting factor. Clay Shirky a lecturer at NYU and prolific writer on the Internet, perhaps somewhat unfairly, suggests:

> *"…Wherever technology is concerned there are a host of nationalistic prejudices: the Americans are early adopters, for example, while the British are a nation of shopkeepers, suspicious of technology and fearful of change."* [86]

Our appetite for faster/better/more powerful applications of technology is, at best, unpredictable. With these complexities in mind, we tentatively predict that the rapid developments of the last 15 years will level out over the next 15 years, coming to a plateau…

Technological developments will mean that by 2020:

- "Computing will be a utility and software a service."[87]

- Costs will be reduced

- High speed wireless connections will blanket cover the whole Northern hemisphere and East Asia. The West Country of England is already 99% WiFi connected, as is the City of London. ISPs in Seoul in South Korea expect to have city-wide wireless services by the end of 2006, with connection speeds 20 times faster than broadband in the UK. [88]

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[86] Available at: http://www.shirky.com/ and contradicted by recent statistics which suggest that Brits are more prolific web users than Americans.

[87] Tom Standage (2005). 'The Future of Technology'. *The Economist*

[88] See http://www.tomorrowproject.net

- Connections will be 'free', paid for through people's combined phone and email bills and/or advertising, and service or 'utility' packages will be highly customised

- People will use wireless connected, location-aware laptops, mobiles and other hand-held devices much as today. Blanket wireless coverage, convergence and miniaturisation will mean that we can always be online. 'Connecting' will no longer be a conscious act

- Hand held devices will be able to write their own personalised software, allowing for MSN Messenger and social network type applications to be fully customised

- Our homes will increasingly be fully connected. Our fridges know when the milk is out of date and order more through the Internet. The Electrolux 'Screenfridge' already has internet connection, email, phone, radio, MP3 and camera facilities

- 'Wearable' computers will be available, the Japanese and Koreans leading the way in actual customer take up

- Web browsers "instantly show you the content you'll find most interesting."[89]

6.1 The changing nature of hardware and software

"Key ingredients of collaborative programming – swapping code, updating instantly, recruiting globally – didn't work on a large scale until the Web was woven. Then software became something you could join, either as a beta tester or as a coder on an open source project. The clever 'view source' browser option let the average Web surfer in

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[89] Ben Hunt: Available at: www.webdesignfromscratch.com

on the act. And anyone could rustle up a link – which, it turns out, is the most powerful invention of the decade." [90]

As outlined above, computers and hand held devices will be able to write their own fully customised software and /or hosting companies will allow for software as a service to be individualised in pay as you go packages.

Situated software will be designed for and integrated into particular social situations and for users customised needs. In addition hand held ICT gadgets will become cheaper in relative terms as they become utilities rather than commodities or luxury consumer goods.

Telephony using landlines as we know and recognise it today will not exist to any significant extent. Single function phones will perhaps find a new value in the ironic retro gadgets market. We will still, of course, make phone calls, but they will use VoIP and video phone technology. See Convergence below:

6.2 Convergence

The majority of phone calls will be made via the internet before 2012. Convergence will also herald the end of the concept (and higher pricing) of international calls. VoIP technology convergence and separate Telephone Number Mapping (ENUM) technologies will convert phone numbers to internet addresses. We will have a single 'number for life' which will follow us from home to home throughout our lives and across the world. [91]

6.3 The Semantic Web

The Semantic Web project, or 'Web 3.0', aims to re-organise all the information on the Web. The theory is that this will allow computers themselves to 'understand' and use information in a manner analogous to an AI 'collective consciousness' by way of 'inference' protocols. Led by

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[90] Kelly, K. 2005. 'We are the web'. On: *wired.com*. 13 August 2005.

[91] *Time*. Web breakthrough could bring cheap calls for all. 12.10.2006

Internet founder, Tim Berners-Lee, the new semantic web will be capable of supporting software agents that are able not only to locate data, but also to understand it in ways that will allow computers automatically to perform meaningful tasks with data – tasks that today must be done manually by computer users.

One critique is that the semantic web's 'language' will be based on *a priori* deductive logic which does not reflect the complexities, ambiguities and contradictions of experience and everyday life. Thus, it will not be a replacement for the complexities of human reasoning when using technologies.

6.4   Changing interfaces: Personal, individual and social – where the technological and social mesh

The medium is the message. The message is the medium. Both are now the *multimedia 'glocal' network*.

Developments in pervasive, persuasive computing will have come to mean that digital devices are integrated into our surroundings and provide 'extensions' to our bodies. Armed with our PDAs the Web will follow us everywhere in the form of our own "personal InfoClouds". [92] The hardware of today's technology which allow us to access the web – mobiles, wifi connected laptops, PCs – will become obsolete. Web technologies and the interfaces through which we access them will become embedded in our environments, recede into the background and become taken for granted. Interfaces such as electronic paper, roll-up and wearable displays, eNewspapers, eBooks will exemplify this.

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[92] A term coined by Thomas Vander Wal, see: http://vanderwal.typepad.com/personal_infocloud/

Andy Clark notes that researchers at the MIT media lab are working on ways of making information flow tangible and manipulable using skills that come naturally to human users.[93]

Sensing technology will be used to extend the reach of already existing online communities such as Flickr by providing information about where users are in space and time. Members of a particular community will be able to use mobile sensing devices to detect other users in the area and to make users aware of their presence.

At present, experimental projects in public access to WiFi systems are being conducted around the world. Ran Wei, an academic at the University of South Carolina School of Journalism and Mass Communications, has researched the likely adoption of WiFi connectivity in the workplace:

> *"Emerging high-speed wireless Internet technologies such as WiFi and WiMAX allow Internet users to go online at broadband speed, anywhere, anytime…offering expanding applications for all organizations…"* [94]

By 2020 our 'self-organising' home environments, comprising fridges, medicine cabinets, garages and the like will have internet capabilities.

As Clark suggests regarding email:

> *"It provides complementary functionality, allowing people informally and rapidly to interact, while preserving an inspectable and revisitable trace. It does this without requiring us both to be free at the same time. Cell phone text messaging has related virtues. The tools that really take off…are those that 'people prefer to use (for certain purposes) even*

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[93] See: http://future.iftf.org/2004/05/interview_with_.html

[94] Ran Wei 2006. Wi-Fi Powered WLAN: When built, who will use it? Exploring predictors of Wireless Internet Adoption in the Workplace. In: *Journal of Computer-Mediated Communication.* 12(1).

when they have the option of interacting in physical proximity...tools that go beyond being there..." [95]

Technological Darwinism will determine which technologies, and 'interface' gadgets progress to widespread adoption. 'Choice' seems to underpin the mass appeal of email, mobile phones and WiFi web connectivity. People do not want their options for communication and exchange limited. Instead they want, the illusion at least, of choosing to text/email/phone/blog – or alternatively and importantly, to do none of these – at *will*.

7   Conclusion

What will the Web look like in 2020? At one level**,** much the same as it does today. Personalised homepages, peppered with customised viral marketing – or none at all in the case of tech savvy 'Life Hacks'. At another level, it will be very different, although still serving the same timeless needs for which it evolved.

VoIP telecoms convergence will mean that we will have a telephone number/email address for life. Software will be run on operating systems over the Web so that there will be much less of a perceptible difference between Microsoft Office applications and web browsers. Usability and access standards will have prevailed, meaning that speed, reliability and clarity of navigation distinguish most websites and webpages. Handheld gadgets and web-connected devices in our everyday environments at work and home will have become 'transparent technologies' – interface tools which we use, and recognise as tools, but tools which when in use become extensions of our own bodies. Technology will allow for 3D space to be created and refined, a Web

[95] Clark, A. 2003. *Natural Born Cyborgs*. Oxford: Oxford University Press. Page 110.

'experience' which suits virtual community sites and the like, and which will have become the norm.

One further significant development will be that all of this gadgetry and technological innovation will be 'greener', using less energy and offsetting its contribution to carbon emissions. The use of the internet as a primary means of avoiding other forms of energy use (travel, paper, etc.) will have become a virtue.

What will the Web do in 2020? Again, it will do what it does today, but differently and similarly characterised by personalised and customised functions. It will be a true 'agora' – a meeting place which is increasingly seamlessly integrated into our conceptions of space, time and life. We will no longer think of online communities and social networking sites as 'alternatives' to 'reality', but instead they will provide additional forums for talking, shopping, working, playing and living.

Where will the Web be? It will be everywhere, pervasive and ubiquitous to the extent of becoming taken for granted. Like the wheel, ink and parchment before it. Divisions between digital and physical worlds will increasingly become blurred. 'Cyberspace' will no longer be separate; a purely digital alternative to the 'real' world. By 2020 it will pervade 'real' space and ultimately, but imperceptibly, change how we think, act and feel. Always on connectivity in large parts of the world will mean that for many of us 'connecting' will no longer be a conscious act.

Internet technologies and applications such as the Web are the result of human beings collaborative efforts. They are framed by the contrasting ideologies of participation, community, individualism and free market capitalism – these will continue to have the potential to make us 'better people'; individually and collectively. Whether they do or not, in the language of Web 2.0, depends for the most part on us users as 'prosumers', and the extent to which we are prepared to imagine a world where the Web is

a medium for enhancing creativity, commerce and community. In this case, 2020 could herald life online as an enriching addition, rather than alternative or replacement, to 'real' life.

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