Net benefit: how the Internet is transforming our world[1]

John Naughton[2]

There's a lovely Latin phrase — *terra firma*. It means "solid earth". It's the basis for a metaphor we use a lot. We talk approvingly about someone who has "his feet on the ground", and disparagingly about people who are "not properly earthed". For us, the earth, the ground, is something dependable, something fixed, something immutable.

And yet for years I lived in Cambridge three doors away from a man named Dan McKenzie who believed otherwise. Dan was a geophysicist who thought that, far from being fixed and immutable, the ground on which we stood was shifting. He was the leading scientist in a small group who formulated, in 1967, the theory of plate tectonics — the view that the earth's surface is comprised of a number of giant plates which are constantly in motion, colliding with or sliding along one another.[3] When they push against one another, huge mountain ranges are created. That's how we got the Himalayas. And when plates scrape against one another, as for example along the San Andreas fault in California, we get earthquakes or tsunamis.

As it happened, Dan was right, and one day I hope he will receive the Nobel Prize for his great insight. His view of how the earth behaves is now accepted as the truth. So while our *terra* may be appear to be *firma*, actually it's moving, with

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[2] Professor of the Public Understanding of Technology, the Open University, Milton Keynes MK7 6AA. Email: j.j.naughton@open.ac.uk.

[3] http://www.agu.org/inside/awards/bios/mckenzie_dan.html

consequences which are sometimes terrible — as we saw in the Asian tsunami of Boxing Day, 2004.

There's a simple and obvious moral here and it is this: even when you think things are immutable, you may be wrong. Huge changes may be taking place under our feet, but only our grandchildren will see them clearly. Which is no consolation to us, because we will be dead and gone by that time.

What I want to do this evening is to apply this philosophy to thinking about our communications environment. My conjecture is that huge, tectonic shifts are under way in this environment; that these changes have momentous implications for our society and its industries; and that we currently lack the tools or the inclination to think coherently about the phenomenon.

What do I mean by "momentous implications"? Well, to illustrate it I want you to join me in a little thought experiment.

I want you to close your eyes and think back to 1993.

The year is 1993. John Major is Prime Minister. The Tories are in government. Tony Blair still looks like Bambi. Bill Clinton has just become President of the United States. Nobody's heard of Monica Lewinsky. Germany is still a prosperous country. Mercedes are still the most reliable cars around. Only grown-ups have mobile phones. Nobody — but *nobody* — outside of academic and research labs has an email address. And a URL — now *that* is something really exotic! Amazon is a river in South America. A googol is the technical term for an enormous number — 1 followed by one hundred zeroes. eBay and iPod are typos. An instant message is something you send via a chap on a motorbike. RyanAir is a small Irish airline which flies to airports nobody has ever heard of. Oh, and there are quaint little shops on the High Street called "travel agents".

Now, open your eyes and spool forward to the present. Hands up who doesn't have an email address. Hands up who doesn't use

Google. Hands up anyone whose company doesn't have a web site.
When was the last time you saw a white van on the motorway that
didn't have www.something.com on the back? Who hasn't bought
books or records from Amazon? Who hasn't thought of bidding for
something on eBay? Anyone who hasn't booked a flight on the Web?
How many people here haven't ordered groceries via Tesco online?

I could go on but you will get the point. 2006 is only
thirteen years on from 1993. Why did I pick that year? Because
1993 was the year that the World Wide Web took off. It had
actually been invented three years earlier by Tim Berners-Lee,
but the spring of 2003 was when the first graphical browser was
launched and the Web became something that ordinary human beings
could understand and use.[4]

The rest, as they say, is history. Today, nobody knows how
big the Web is. When it stopped publishing the number, Google
was claiming to index 8 billion pages, but everyone knows that
was just the tip of the iceberg. Some sensible people are
claiming that the web is 400 times bigger than the number of
pages indexed by Google. 400 times 8 is 3,200. So a publication
medium which contains over 3,000 *billion* pages has come into
being in little over a decade, and it's growing by maybe 25,000
pages an hour. This is a revolutionary transformation of our
environment by any standards.

What does this mean?

The honest answer is that we haven't a clue, and to see why I
want you to join me in another little thought experiment.

Think back to the year 1455. Why 1455? Well that was the year
when a peculiar guy living in Mainz in Germany, name of
Gutenberg, published the bible he had created using a fancy
invention called moveable type. It was the world's first printed
book.

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[4] see John Naughton, *A Brief History of the Future: the origins of the Internet*,
London, 1999, Phoenix.

Printing was a revolutionary transformation of mankind's communications environment. Up to then, books were strictly a minority sport — the preserve of a tiny, rich and powerful elite, centred on the Church and the aristocracy. But in time, printing created the modern world. It undermined the authority of the Catholic church, enabled the Reformation and the Enlightenment, powered the rise of nationalism and of modern science, created new social classes and stimulated the creation of the educational system we still rely on today.

It even changed our conception of 'childhood' as a protected phase in people's lives. Before print, the definition of adulthood was when a child reached the point where it was competent to participate in an oral culture. In the Middle Ages, that age was seven — which is why the Catholic Church defined seven as the 'age of reason', the age at which a person could be deemed responsible for their behaviour. (That's why you never see children in a Breughel painting — you just see small adults.) But in a print-based culture, it took longer to get kids to the point where they could competently participate in the business of life. So 'childhood' was extended effectively until the age of 14 — which as you know was the original school-leaving age.[5]

Now all of this flowed from Gutenberg's invention in 1455. But neither he nor his contemporaries could have had any idea what it would lead to. And if you imagine a MORI pollster going around Mainz in 1468 with a clipboard and asking citizens for their opinion of what the long term impact of the technology would be, well you can see how absurd the idea is.

All of which leads me to formulate Naughton's First Law. (I should explain that, for an academic, it is a great career move to have a Law named after you. Think of Newton and his Three Laws. So consider this my bid for fame.)

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[5] See Neil Postman, *The Disappearance of Childhood*, Vintage, 1994.

Newton's First Law is very simple: it says that for every action there is an equal and opposite reaction. Naughton's First Law is equally straightforward.

It says that we invariably *over-estimate* the short-term implications of new communications technologies, and we greviously *under-estimate* their long term impacts.

The great Internet Bubble of 1995 — 2000 was based on crazy over-estimates of short-term impacts leading to what one economist memorably christened "irrational exuberance"[6]. But we've been though all that, and emerged sadder, poorer and I hope wiser. Now is the time to turn to longer-term implications.

So in what follows I'm going to think aloud about what these might be. And the reason I've gone on at some length about printing is to provide a health warning. I don't know what the future holds any more than the next academic. But what I *can* do is suggest some ways of thinking about it.

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The conventional way of thinking about this stuff is what John Seely Brown[7] calls "endism" — the perspective that sees new technologies as replacing or even wiping out older ones. Thus at the moment we see a great deal of angst in the newspaper business about whether online news sites will wipe out newspapers. Well, maybe they will, but that has more to do with classified advertising than with news. The truth is that the interactions between old and new communications technologies are actually very complex.

For example, when the CD-ROM arrived, people predicted the demise of the printed book. It didn't happen. In fact, books are doing quite nicely. When TV arrived, people predicted the

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[6] Robert J Schiller: *Irrational Exuberance*, Princeton University Press, 2000.

[7] John Seely Brown and Andrew Duguid: *The Social Life of Information*, Harvard Business School Press, 2000. See http://www.sociallifeofinformation.com/toc.htm for contents and downloadable chapters.

end of radio and indeed of movies. It didn't happen. Radio and movies are doing quite nicely, thank you. TV news was going to wipe out newspapers. It didn't happen. And so on.

But at the same time *something* happened. Although the CD-ROM didn't wipe out the printed book it did change forever the prospects for expensive reference works. Remember *Encyclopedia Brittannica*? And as for videotapes and DVD, well the movie studios now make more revenue from them than they do from cinemas. And so on.

So where do we find an intellectual framework which captures the complexity of these interactions? The answer was suggested many years ago by the late Neil Postman, a Professor at New York University who was the most perceptive critic of media and communications technology since Marshall McLuhan. In a series of witty and thought-provoking books — with titles like *Teaching as a Subversive Activity*, *Amusing Ourselves to Death*, *The Disappearance of Childhood* and *Technopoly* -- Postman described how our societies are shaped by their prevailing modes of communication, and fretted about the consequences.

In seeking a language in which to talk about change, I've borrowed an idea from Postman — the notion of *media ecology*, that is to say, the study of media as environments. The term is borrowed from the sciences, where an *ecosystem* is defined as *a dynamic system in which living organisms interact with one another and with their environment*.[8] These interactions can be very complex and take many forms. Organisms prey on one another; compete for food and other nutrients; have parasitic or symbiotic relationships; wax and wane; prosper and decline. And an ecosystem is never static. The system may be in equilibrium at any given moment, but the balance is precarious. The slightest perturbation may disturb it, resulting in a new set of

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[8] W.B. Clapham: *Natural Ecosystems*, New York, Macmillan, 1973.

interactions and movement to another — temporary — point of equilibrium.

This seems to me to be a more insightful way of viewing our communications environment than the conventional 'market' metaphor commonly used in public discussion, because it comes closer to capturing the complexity of what actually goes on in real life.

A good illustration of ecological adaptation comes from the interaction between television and newspapers in the UK. There came a point — sometime in the late 1950s — when more people in Britain got their news from TV than from newspapers. This created a crisis for the papers. How should they respond to the threat? Well, basically they reacted in two different ways. The popular papers — the ones with mass circulations and readers lower down the social scale -- essentially became parasitic feeders on television and the cult of celebrity that it spawned. (They're now also parasitic feeders on Premiership football.) The broadsheets, for their part, decided that if they could no longer be the first with the news, then they would instead become providers of comment, analysis and, later, of features. In other words, television news did not wipe out British newspapers. But it forced them to adapt and move to a different place in the ecosystem.

The 'organisms' in our media ecosystem include broadcast and narrowcast television, movies, radio, print and the Internet (which itself encompasses the Web, email and peer-to-peer networking of various kinds). For most of our lives, the dominant organism in this system — the one that grabbed most of the resources, revenue and attention — was broadcast TV. Note that 'broadcast' implies few-to-many: a relatively small number of broadcasters, transmitting content to billions of essentially passive viewers and listeners.

This ecosystem is the media environment in which most of us grew up. But it's in the process of radical change.

How come? Answer: because broadcast TV is in inexorable decline. Its audience is fragmenting. Twenty years ago, a show like *The Two Ronnies* could attract audiences of up to 20 million in the UK. Now an audience of five million is considered a stupendous success by any television channel. In five years' time, 200,000 viewers will be considered a miracle.

Broadcast TV is being eaten from within: the worm in the bud in this case is narrowcast digital television -- in which specialist content is aimed at specialised, subscription-based audiences and distributed via digital channels. But waiting in the wings is something even more devastating — Internet Protocol TV (IPtv) — which is technospeak for television on demand, delivered to consumers via the Internet. And it's coming fairly soon to a computer monitor near you.

The trouble for broadcast TV is that its business model is based on its ability to attract and hold *mass* audiences. Once audiences become fragmented, the commercial logic changes.

And that's not all. New technologies like Personal Video Recorders (PVRs) — essentially recorders which use hard drives rather than tape and are much easier to program — are enabling viewers to determine their own viewing schedules and — more significantly — to avoid advertisements. Think of Sky Plus. Think of TiVO. As the CEO of Yahoo said recently at the Consumer Electronics Show in Las Vegas, the era of "appointment-to-view" TV is coming to an end.

Note that when I say that broadcast TV is declining, I am **NOT** saying that it will disappear. That's what John Seely Brown calls "endism' and it's not the way ecologists think. Broadcast will continue to exist, for the simple and very good reason that some things are best covered using a few-to-many technology. Only a broadcast model can deal with something like a World Cup final or a major terrorist attack, for example — when the attention of the world is focussed on a single event or a single place. But broadcast will lose its dominant position in the

ecosystem, and that is the change that I think will have really profound consequences for us all.

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What will replace broadcast TV as the new dominant organism in our media ecosystem? Simple: the ubiquitous Internet.

Note that I do not say the Web. The biggest mistake people in the media business make is to think that the Net and the Web are synonymous.

They're not. Of course the Web — as I intimated earlier -- is enormous, but it's just one kind of traffic that runs on the Internet's tracks and signalling. And already the Web is being dwarfed by other kinds of traffic. According to data gathered by the Cambridge firm Cachelogic, peer-to-peer networking traffic now exceeds Web traffic by a factor of between two and ten, depending on the time of day. And I've no doubt that in ten years' time, P2P traffic will be outrun by some other ingenious networking application, as yet undiscovered.

Already the signs of the Net's approaching centrality are everywhere. We see it, for example,

- in the astonishing penetration of broadband access in developed countries,

- in the explosive growth of e-commerce,

- in the streaming of audio — and, increasingly, video across the Net,

- in the sudden interest of Rupert Murdoch and other broadcasters in acquiring broadband companies,

- in declining newspaper sales and the growth of online news

- and in the stupendous growth of internet telephony —
  spurred by the realisation that, sooner rather than
  later, all voice telephony will be done over the Net.[9]

Oh and I almost forgot to mention the looming implications
of Radio Frequency Identity (RFID) technology, together with Wi-
Fi and mesh networking.

And then there's the fact that you can now buy episodes of
popular US TV series on the Apple iTunes store, download them
onto your computer — and watch them on your sparkling new Video
iPod.

Oh and there's BBC Radio's "listen again" facility, whereby if
you miss a programme (the Archers, say) you can always click on a
link and have it streamed to your computer at a time that suits
you.

And I haven't mentioned, have I, that you can do the same for
24 hours with BBC2's *Newsnight* programme?

And of course there's Google, a phenomenon that deserves an
entire lecture to itself.

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What does this mean?

Well, first of all, these developments illustrate the extent
to which the Internet is becoming central to our lives.

In 1999, Andy Grove, who was then the CEO of Intel, made a
famous prediction. In five years' time, he said, all companies
will be Internet companies or they won't be companies at all.[10]

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[9] "It is now no longer a question of whether VOIP will wipe out traditional
telephony, but a question of how quickly it will do so. People in the industry
are already talking about the day, perhaps only five years away, when telephony
will be a free service offered as part of a bundle of services as an incentive
to buy other things such as broadband access or pay-TV services. VOIP, in
short, is completely reshaping the telecoms landscape." *Economist*, 15
September, 2005.

[10] *Economist*, 24 June, 1999

At the time, people laughed. Did he mean that every hamburger joint and hardware store would have to be online by 2004? What a ridiculous idea!

In fact it was an exceedingly insightful prediction. What Grove meant was that the Internet would move from being something rather exotic to being a kind of utility like electricity or the telephone. None of us today could envisage being in business without making use of both. As the *Economist*, put it,

> "The Internet is helping companies to lower costs dramatically across their supply and demand chains, take their customer service into a different league, enter new markets, create additional revenue streams and redefine their business relationships. What Mr Grove was really saying was that if in five years' time a company is not using the Internet to do some or all of these things, it will be destroyed by competitors who are."[11]

The point of all this is that while we grew up and came to maturity in a media ecosystem dominated by broadcast TV, our children and grandchildren will live in an environment dominated by the Net. And the interesting question — the point, in a way, of this lecture — is what will that mean for us, and for them?

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In thinking about the future, the two most useful words are 'push' and 'pull' because they capture the essence of where we've been and where we're headed.

Broadcast TV is a 'push' medium. By that I mean that a relatively select band of producers (broadcasters) decide what content is to be created, create it and then *push* it down analogue or digital channels at audiences which are assumed to consist of essentially passive recipients.

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[11] *ibid.*

The couch potato was, *par excellence*, a creature of this world. He did, of course, have *some* freedom of action. He could choose to switch off the TV; but if he decided to leave it on, then essentially his freedom of action was confined to choosing from a menu of options decided for him by others, and to 'consuming' their content at times decided by them. He was, in other words, a human surrogate for one of BF Skinner's pigeons — free to peck at whatever coloured lever took his fancy, but not free at all in comparison with his fellow-pigeon perched outside on the roof.

The other essential feature of the world of push media was its fundamental asymmetry. All the creative energy was assumed to be located at one end (the producer/broadcaster). The viewer or listener was assumed to be incapable of, or uninterested in, creating content; and even if it turned out that he was capable of creative activity, there was no way in which anything he produced could have been published.

Looking back, the most astonishing thing about the broadcast-dominated world was how successful it was for so long in keeping billions of people in thrall. Networks could pull in audiences in the tens of millions for successful and popular broadcasts — and pitch their advertising rates accordingly. Small wonder that one owner of a UK ITV franchise (I think it was Roy Thompson) described commercial television (in public) as "a licence to print money".

But in fact the dominance of the push model was an artefact of the state of technology. Analogue transmission technology severely limited the number of channels that could be broadcast through the ether, so consumer choice was restricted by the laws of analogue electronics. The advent of (analogue) cable and satellite transmission and, later, digital technology changed all that and began to hollow-out the push model from within.

The Internet — and particularly the Web — is exactly the opposite of this. The Web is a *pull* medium. Nothing comes to

you unless *you* choose it and click on it to 'pull' it down onto your computer. You're in charge. In the words of Rupert Murdoch's daughter, Elizabeth, the Web is a "sit up" medium, in contrast to TV, which is a "sit back" medium.

So the first implication of the switch from push to pull is a radical increase in consumer sovereignty. We saw this early on in e-commerce, because it became easy to compare online prices and locate the most competitive suppliers from the comfort of your own armchair. Just one illustration: over 80 per cent of prospective customers nowadays turn up at Ford dealerships in the US armed not only with information about particular models, but also with detailed data on the prices that dealers elsewhere in the country are charging for those models.[12]

We're now seeing this in other areas too — for example in the way prospective students click their way through the websites of competing universities while deciding which ones to apply to.

But the Internet doesn't just enable people to become more fickle and choosy consumers. It also makes them much better informed — or at least provides them with formidable resources with which to become more knowledgeable. Search technology is the key to this. In an interesting recent book, *The Search*, John Battelle describes the dramatic effects that search engines like Google are having on the advertising and marketing industries.

> "In the past few years", he writes, "search has become a universally understood method of navigating our information universe: much as the Windows interface defined our interactions with the personal computer, search defines our interactions with the Internet. Put a search box in front of just about anybody, and he'll know what to do with it. And the aggregate of all those

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[12] "Crowned at last", *Economist*, 31 March, 2005.

searches, it turns out, is knowable: it constitutes the database of our intentions". [13]

The Internet and related communications technologies are making people more connected. The average person today interacts with far more people than her father did. As the *Economist* puts it in a recent article:

> "A famous 1967 study by Stanley Milgram (which later became the basis for a film) suggested that there were at most "six degrees of separation" between any two people in America, meaning that the chain of acquaintances between them never had more than six links. According to more recent work along similar lines, that number has now fallen to 4.6, despite the growth in America's population since Milgram's study. Being able to keep in touch with a much wider range of people through technologies such as e-mail has brought everyone closer."[14]

The Internet is also making it much harder for companies to keep secrets. If one of your products has flaws, or if a service you provide is sub-standard, then the chances are that the news will appear somewhere on a Blog or a posting to a newsgroup or email list. There was a celebrated case of this some time ago with Kryptonite bike locks which — it turned out — could be opened by anyone equipped with a Bic biro. The company knew of the flaw, but did nothing until news of it was published on a cycling website. And then all hell broke loose.[15]

And in the last few months, the giant Sony corporation has been crucified because of the discovery — first published on a Blog — that copy-protection software on Sony music disks was

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[13] John Battelle, *The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture,* Portfolio, 2005, page 4.

[14] "The New Organisation", *Economist*, 21 January, 2006.

[15] "Lock, stock and caught over a barrel", *Observer*, 26 September, 2004. Online at: http://observer.guardian.co.uk/business/story/0,6903,1312736,00.html

covertly installing software on customers' PCs which could compromise their security. It's not clear exactly when Sony had become aware of the problem but when the story finally broke -- on a techie's Blog -- the company's various inept attempts at denial and damage-limitation were relentlessly exposed and discredited by enraged consumers hunting in virtual packs.[16]

My conjecture therefore is that nobody who offers a public service will be immune from this aspect of a ubiquitous Net. And with every day that passes we see other examples. Take for instance the maddening hypocrisy of companies whose call centres give you a recorded message saying that they really value your call and then drag you through a Kafkaesque maze for 20 minutes before you get even a chance to talk to a human being. There's now a useful website[17] on which users post the key codes needed to bypass the maze. For Citibank in the US, for example, the sequence you need is 0#0#0#0#0#0#! And the name of this site? Why www.gethuman.com

Some years ago, I gave a presentation at a seminar in Addenbrooke's Hospital in Cambridge on the future of information technology and how it might affect the health service.

The thing I remember most from the event is a statement made by a quietly-spoken medical researcher from the National Institute of Health. The biggest challenge General Practitioners will face in 2010, he said, was "how to deal with the Internet-informed patient".

And I don't think he was joking.

The emergence of a truly sovereign, informed consumer is thus one of the implications of an Internet-centric world. The days when companies could assume that the only really demanding

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[16] See "How Sony became an Ugly Sister", *Observer*, 18 December, 2005. Online at http://observer.guardian.co.uk/business/story/0,6903,1669722,00.html

[17] http://www.gethuman.com/us/

customers they were likely to encounter were those who subscribed to *Which?* are over.

Another implication is that the asymmetry of the old, push-media world may be replaced by something much more balanced.

Remember that the underlying assumption of the old broadcast model was that audiences are passive and uncreative.

What we're now discovering is that that passivity and apparent lack of creativity may have been more due to the absence of tools and publication opportunities than to intrinsic defects in human nature. Certainly, that's the only explanation I can think of for what's been happening on the Net in the last few years.

Take Blogging — the practice of keeping an online diary. There are millions and millions of the things — when I last checked the other night Technorati, a Blog-tracking service, was claiming to be monitoring over 28.9 million, and the number of them is doubling every five and a half months. The current creation rate is 75,000 a day — that's about one a second.[18] Many of them are, as you might expect, mere dross — vanity publishing with no discernible literary or intellectual merit. But something like 13 million Blogs were still being updated three months after their initial creation, and many of them contain writing and thinking of a very high order. In my own areas of professional interest, for example, Blogs are always my most trusted online sources, because I know many of the people who write them, and some of them are world experts in their fields.[19]

What is significant about the Blogging phenomenon is its demonstration that the traffic in ideas and cultural products isn't a one-way street — as it was in the old push-media ecology.

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[18] Dave Sifri, "State of the Blogosphere, February 2006", online at http://technorati.com/weblog/2006/02/81.html

[19] For example, Professor Ed Felten of Princeton, a leading expert on digital rights management, encryption and related issues whose Blog (http://www.freedom-to-tinker.com/) is a must-read for anyone interested in these arcane but important matters.

People have *always* been thoughtful and articulate and well-informed, but up to now relatively few of them ever made it past the gatekeepers who controlled access to publication media. Blogging software and the Internet gave them the platform they needed — and boy have they grasped the opportunity!

The other remarkable explosion of creativity comes from digital photography. In the last few years an enormous number of digital cameras have been sold — and of course many mobile phones now come with an onboard camera. The trend is so pronounced that even the biggest names in photography are getting out of film. Kodak decided to stop making film cameras some time ago. Recently, Nikon announced that it was planning the same thing. And Konica Minolta has now announced that it too is going completely digital.

So every day, millions of digital photographs are taken. Until the advent of a site called Flickr.com, an understandable response to this statement would have been "so what?" But Flickr allows people to upload their pictures and display them on the Web, each neatly resized and allocated its own unique URL. And it has grown like crazy — to the point where it was acquired by Yahoo[20] in March 2005 for an undisclosed pile of serious money.

I don't know how many photographs Flickr holds, but it already run into many millions.[21] For me, the most interesting aspect of it is that users are encouraged to attach tags to their pictures, and these tags can be used as the basis for searches of the entire database. The other day I searched for photographs tagged with 'Ireland' and came up with 122,000 images! (A month earlier, the same search had come up with 85,000.) Of course I didn't sift through them all, but I must have looked at a few

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[20] "A Flickr of the digital camera switch and the folksonomy system is born", *Observer*, 27 November, 2005. Online at: http://observer.guardian.co.uk/business/story/0,6903,1651448,00.html

[21] In December 2004, Salon.com was reporting 2.2 million and growing at a rate of 30,000 per day. See http://www.salon.com/tech/feature/2004/12/20/flickr/. These estimates are now seriously out of date.

hundred. They were mostly holiday and casual snapshots, but here and there were some truly beautiful images. What struck me most, though, was what they represented. Ten years ago, those snapshots would have wound up in a shoebox and would certainly never have been seen in a public forum. But now they can be — and are being — published, shared with others, made available to the world. And this is something new. And something important for those of us who aspire to reach audiences with our messages.

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What I'm really trying to say is that the world has changed out of all recognition already. And if I'm right about the analogy with printing, this is just the beginning. We ain't seen nothin' yet.

Now it would be impertinent of me to try to spell out what all this might mean for you. You know your own business best. But here's a salutary tale and a closing thought.

The thought is that no industry can afford to ignore what's going on, even if it thinks that the Internet is nothing to do with it.

If you want a case study of this, consider what happened to the music industry.

In the early 1980s, recorded music went digital with the arrival of the compact disk. Recording studios pumped out music as streams of ones and zeroes; and at the consumer end, CD players translated those ones and zeroes back into sounds. The problem was: how to get those ones and zeroes — those digital bitstreams — from studio to player. The solution was to burn the bits onto plastic disks and distribute those to consumers. That meant making the disks, burning the music onto them, printing labels, packing them into boxes (which always seemed to break), packing the boxes into bigger boxes, putting those on pallets, loading the pallets onto trucks, delivering them to warehouses, who then delivered them to retailers, who took the disks out of

the boxes and put the boxes on display and… I could go on, but you will see what a wasteful, inefficient, *brain-dead* way that was for distributing a product.

Nevertheless, the record industry built a very cosy business out of this. There was one small problem: the economics of producing and shipping disks meant that there was little commercial mileage in selling single tracks, so the industry focussed on selling albums and increasingly ignored the consumer demand for tracks. And it might have continued doing this forever, but for one thing: the Internet.

In 1999 a disaffected music lover called Shawn Fanning sat down and wrote some software which enabled people easily to locate and share music tracks over the Net. He called it Napster. Within 18 months, Napster had 80 million subscribers, swapping millions of tracks every hour of every day. The music industry eventually got Napster shut down, but by then the genie was out of the bottle. And even today, as I speak, millions of music tracks are being illicitly shared across the Net (remember that Cachelogic survey of Internet traffic), and the only hope for the music industry is to fall in with the legal downloading services offered by companies like Apple with its iTunes Store. Since it opened the store, Apple has sold a million tracks a day, and last week celebrated the sale of its *billionth* song.

One of the defensive arguments used by the record companies to justify their existence — not to mention their stock options -- was that only they could find and nurture talent. Without them, so they implied, the Rolling Stones and U2 would still be playing in pubs, clubs and student raves. Well, I don't know if you've heard of a Sheffield band called the Arctic Monkeys, but I'm willing to bet your kids have. They've suddenly become the biggest band in Britain. And they did it by releasing their music — free — on their website, and letting fans spread it by word of mouth. Eventually a record label came begging to be allowed to take them on. It is bands like Arctic Monkeys, not

record companies, that are the future of the music business. Nobody is indispensable any more.

The moral of the story is that you ignore changes in the communications ecology at your peril. Remember what Andy Grove said all those years ago. Companies that are not Internet companies won't be companies at all.

If you have been, thank you for listening.