For the Sake of Revolution

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Introduction

There is an old saying that a revolution devours its own children. Nowhere is this more accurate than in the present "information revolution". More specifically, it's the next phase of this ongoing revolution, that of the mobile Internet and m-commerce (mobile commerce), which contains the greatest risk. Central to this are mobile phones and the potential health hazards they pose.

There has been much information and misinformation in both conventional media and new media about the issue. What this article attempts to do is put all these arguments and counter-arguments into proper perspective. The first part will deal with the issue at hand: assertions that extensive mobile phone use can lead to averse health effects, namely cancer. Much of this is based on the *Adelaide Hospital Research Study*, provided by the Australian technical writer Stewart A. Fist.

Following this is an analysis of how the issue is handled vis-a-vis public concern for safety. Subsequently, the issue will be put into perspective of the mobile communications industry, and what this may entail for the future. From this, it will be shown how the lessons of the past have not been learned and that governments, industry, and consumers – like the three monkeys who prefer to cover their ears, eyes, and mouths – are going down the same road travelled by other industries in the past, such as silicon, asbestos and tobacco.

By the conclusion of this article it will be shown how government and industry – both fearful of the impact negative news might have on an economy increasingly dependent on advanced information and communications technologies – have conducted a complex (and so far successful) campaign to accentuate the positive aspects of mobile communications technology whilst silencing opposition to the contrary.

The Adelaide Hospital Research Study

With the release of the *Adelaide Hospital Research Study* (henceforth, the *Adelaide Study* or *AHR*) in April 1997, it has been concluded that cell phones can cause health problems. The question, therefore, is not whether they cause problems, but the nature of these problems. What is more, cause-and-effect aren't necessarily immediate and obvious.

After its initial completion, the Adelaide Study was not published for nearly two years. It was rejected, according to the scientists involved, for political reasons.

Additionally, the journal *Science* said it was too hot to handle, and *Nature* insisted that the work be replicated first before publication.

In a nutshell, the *Adelaide Study* looked into tumour promotion in transgenic mice using GSM-pulsed cell phone exposures for up to 18 months at relatively normal power-density levels. It follows the Lai-Singh study in Seattle which showed a radical increase in double-strand DNA breaks in rat-brains following 2 hours of exposure to microwaves.

The study provides a clear-cut result showing genetic alterations in cells following reasonably low level exposures to cell phone radiation. It showed a doubling of the number of tumours in mice following one hour of exposure per day, over a 9 to 18 month period.

The concern is mainly about the potential for future health problems, rather than for the present. Most cancers are caused by progressive damage to DNA. Hence, the use of a cell phone over the lifetime of a human being can produce tumours and other health effects which manifest themselves only later on in life. What is more, these problems can be passed on to succeeding generations, depending on the extnet and nature of the DNA damage.

Yet DNA-cancers are only one problem. Many other short and long-exposure brain conditions such as Altzheimers and melatonin changes are also implicated in the study.

Although the findings in the *Adelaide Study* are enough for Luddites to start destroying cell phones en masse, it's actually a low-probability – but high potential risk – problem. Moreover, few things in our society can be considered perfectly safe. Thus, allowance must be made for the productive value in having these devices.

Still, this doesn't means that consumers shouldn't get adequate warning. Nor does this justify supporters of the cell phone industry to avoid the issue through the spread of misinformation and outright media manipulation.

Unfortunately, research into cell phone use is being manipulated around the world and the truth is constantly being twisted, mainly by US companies and their political front organisations, such as the Cellular Telephone Industry Association (CTIA) and its "arms-length" research corporation, Wireless Technology Research (WTR). In Germany the research organisation FGF (Forschungs Gemeinschaft Funk) occupies a similar place in Europe. The FGF has long been the premier source of funding for non-ionising radiation research, and has been financed by the likes of Deutsche Telekom and Siemens.

Outside of the US and the EU, the UN also seems to be involved in the deliberate spread of misinformation. Working for the World Health Organisation (WHO), Dr. Michael Repacholi, an Australian from Adelaide who has been closely aligned with the cellular phone industry for many years, has pursued a hard line that cell phones are proven safe. Even when the WHO publicly called for more research into the issue of cell phone health risks, Repacholi referred to the issue as

“perceived risks” when, in fact, the risks are not “perceived” but actually well known; what is at issue is the question of impact.

Often, the misinformation being spread is of a very subtle nature. For example, “adverse health effects” are often referred to rather than the dreaded word “cancer”. In much the same way, the word “energy” is used as a cover for radio waves or radiation exposure. Likewise, “communications equipment” replaces the word cell phones, where possible, as the potential cause of problems. As Stewart Fist comments, “it’s enough to make you not want to risk using a normal phone, isn’t it?”

The combined power of industry lobbyists, “tobacco-science”, and public relations have thus far been able to keep a cap on this problem. They put their trust in the surety of public ignorance, and the “concern-overload” people now suffer from due to the constant bombardment of health, nutrition and environmental claims and counter-claims.

A prime example of this is in the “cell phone debate”. There are actually two distantly-related exposure conditions, yet often they are perceived as one. These are transmitter tower radiation (cell phone towers are large, ugly, proliferating and intrusive, yet there is almost no evidence of any causal connection between tower emissions and health consequences) and cellular handset emissions. Within this last category are a further three separate problems. These have to do with direct radiation from the antenna, inductance transfer, and far-field exposure from the antenna (this creates a potential problem akin to that of passive smoking).

Through the use of skillful media manipulation and the spread of misinformation, the public has ended up lumping all these problems into one, over-simplified issue. At the same time, there are significant adverse health effects of a wide range, not just cancer, associated with cellular phone use. Cell towers actually have little to do with this. Rather, it has to do with the handsets themselves – and more specifically, with pulsed TDMA type systems (as with GSM) rather than analogue ones (AMPS, TACS and NMT). Media attention, however, is foremost directed towards public irritation at the aesthetic issue of cell phone towers, with only some lesser attention to health issues related to handsets.

Another tactic often used in terms of media manipulation is whitewashing any serious research. A high percentage of the research is designed to have negative results, and these are then loudly trumpeted by industry as proof of safety. The FGF in Germany, for example, found that “no health effects” were proven, and promoted this finding publicly and loudly as “no reason to worry”. However, information pertaining to some of their other research projects in the field seemed to have disappeared without reports ever being written up or published.

Likewise, as the research arm of the cell phone industry, the WTR was asked to get to the bottom of “persistent rumors” that cell phone use may endanger the human brain. Their results conveniently skirted the issue. Although it was suggested that there was a correlation between cell phone emissions and brain tumours and DNA breakage in rats, it was deemed that the research was “far from conclusive” and further in-depth follow-up studies would be needed. [1]

Far from providing any form of scientific knowledge, what the WTR study showed instead was the need for independent research. As part of the CTIA's five-year research program "designed to show that its products are safe", it was only natural that their conclusions would be a whitewash. The cell phone industry has captured control of most of the research being conducted around the world into the cell phone problem. This follows a pattern already established by the asbestos and tobacco industries.

A final tactic used by supporters of the cell phone industry, when all else fails, is the use of attacks and criticism. With the *Adelaide Study*, for instance, scientists and the cell phone industry have been trying to play down the results because of the economic and political nature of the findings. One of the most common rejections of the findings is that although the experiments have produced cancer in mice, it would be different with humans for we are of a different species.

Such arguments are spurious, and use a pseudo-logic that is meant to sway an uninformed public. As one of the scientists involved in the *Adelaide Study* put it: "men might not be rodents, but DNA is DNA." Even the European Commission admits as much: "many scientists believe that the mouse is a suitable mode for human genomics, and they hope that using the mouse will help researchers to better understand human disorders, such as cancer, and how they may be treated and cured." [2] Thus, if radiation exposures effect mice, then it will most certainly effect humans, for humans get cancers in the same way as mice. The question at this point is one of extent.

Another criticism frequently made of the *Adelaide Study* is that the radio frequencies used in quite a lot of the research do not exactly match those of cell phones. This, too, is a spurious criticism, for devices operate pretty much the same over a range of frequencies.

Nonetheless, this is the most common argument used by the cell phone industry, along with the defence that cell phone transmission powers are all within standards. This last point is aruguable, however, for Swiss studies on GSM phones have often found them exceeding the standards.

Even if the notion that cell phone transmission powers are all within standards, the use of such standards in the first place is totally ridiculous. The standards are set on simplistic Watt ratings because they are based on heating effects, not penetration. Thus, these standards have been set on the basis of heating effects, which don't exist, while ignoring cell damage, which does.

Muddling the Issue

In general, muddling the issue of the relationship between cell phone use and health is done in three ways: through denial or suppression of the facts, misinformation and confusion and, if all else fails, claiming that results are "inconclusive". An example of this is a FAQ (Frequently Asked Questions) file put out by John Moulder of the Medical College of Wisconsin entitled "Cellular Phone Antennas and Human Health". [3]

From the title itself it can be seen how the nature of the FAQ file is being framed. The general term "cellular phone antennas" lumps the issue of base antennas and handsets together, when its the effect of the latter which is of ultimate concern. Moreover, the FAQ file doesn't take into account that the problem with cell phones is not the signals it transmits, but the fact that it's a radiating device which is held extremely close to the human body.

A more extreme example of muddling the issue is an article in the *Virginia Journal of Law and Technology* (VJLT) by Laura Grasso entitled "Cellular Telephones and the Potential Hazards of RF Radiation: Responses to Fear and Controversy" [4]. From the outset, the article attempts to set the tone by noting that science has not proved nor disproved allegations surrounding radio-frequency (RF) radiation. This, of course is not true: allegations were proven; what was lacking is more in-depth research. What is more, the failure of this continued research was on the account of the WTR dragging its feet. Like the tobacco companies, the main objective is to stifle research and hide any forthcoming results which may be damaging.

Grasso's article doesn't conceal her true concern over the issue of cell phone use and health risks: the possibility that prolonged cell phone use can be dangerous "could stunt the development of the cellular phone industry and drive a useful product out of the market." This is a line often used to justified the existence of harmful products on the market. As with tobacco, once people are hooked it will be too late to turn back; hence, the product ends up becoming an evil we must learn to live with now that its exists.

This, in part, explains the procrastination on the part of the cell phone industry to deal with the issue. Wireless Technology Research, created by the CTIA to run their five-year research program "designed to show that its products are safe", had spent 25 million USD (most notably on damage control) before sponsoring a single biological experiment.

As with so many other articles and FAQ files on the subject, there is no denying that RF radiation causes averse health effects. However, by using certain phrases which invariably point out that there is no "conclusive" evidence, it is suggested that continued use must be ok until a "definitive" link can be found. In effect, it totally ignores the precautionary principle which should come into play in these kinds of situations. In fact, Grasso attacks the precautionary principle by arguing that risk-based regulation (the legal basis for the precautionary principle) is simply ill-defined and unnecessary. On the issue of cell phones, she writes: "non-thermal effects are not well-established and, currently, do not form a scientifically acceptable basis for restricting human exposure to RF radiation from cellular telephones."

Not only are arguments against any form of risk-based legislation clearly apparent, but explanations as to why industry attempts to stifle research are also provided. In essence, the reason why the WTR has done so little is because cell phone manufacturers believe that safety research for latent hazards increases exposure to litigation and catastrophic liability. Therefore, to protect themselves from liability, many manufacturers choose to remain ignorant of the latent

hazards of their products, relying on the causation-rule in toxic torts to escape liability. This explains why the WTR has done so little over the past decade.

Yet it's not only industry which is afraid of possible litigation, but governments as well. Courts fear that once a victory has been established, it would open a floodgate of litigation and class action suits. Precedents do exist: for instance, as in the case with asbestos, litigation against manufacturers grew into monstrous dimensions.

As a result, there appears to be biased judicial treatment of RF radiation cases. The first such case to be brought to court was Reynard vs. NEC Corp., where it was claimed that exposure to RF radiation initiated, or aggravated and accelerated, the growth of a brain tumor which eventually killed the plaintiff's wife. Fearing the landslide litigation this would cause, the court not surprisingly established a strict standard for determining the admissibility of the types and quality of scientific evidence and expert testimony.

In many ways, it can now be said that the role of science has been put on trial, as court judges no longer take a deferential view of science, but now consider how the experts arrive at their opinion. Authors like Grasso see nothing wrong with this: "Without conclusive scientific evidence to justify further action, this approach of restraint is proper, if not necessary, to preserve the integrity of policy makers charged with the difficult task of protecting the public from the unknown risks of RF radiation."

This rationale, in essence, is nothing more than a justification for doing nothing, despite the fact that a possible link may exist. The precautionary principle has been side-lined for the sake of economic progress. In other words, governments and judicial authorities have sold themselves out to the highest bidder.

Still, in order to give the impression that the issue is being looked into seriously and not simply swept under the rug, various inter-governmental agencies have expressed their opinions and showed some "concern" over the issue. The WHO, for example, had already in 1997 called for more research into whether mobile phones, power lines and radar might cause health problems such as cancer and Alzheimer's disease. More specifically, the WHO's five-year program was to pool studies to assess risks linked to exposure to electrical and magnetic fields in the frequency range of 0-300 Ghz.

The WHO involvement, far from being an impartial body dedicated to an objective assessment of the issue, has unfortunately done its share to help the mobile phone industry to muddle the issue. This has usually been accomplished through the skillful utilisation of diplomatic language. References to "mixed evidence" and that "science would likely proved otherwise" already instilled within the WHO a framework for accepting industry claims that cell phones are totally safe.

Comments by Dr. Michael Repacholi, manager of the WHO's Electromagnetic Fields Project, that "there have been suggestions that electromagnetic fields may produce cancers or memory loss or other neuro-degenerative diseases" [5] betrays this pre-determined stance toward research results and an attempt at damage

control on the part of the WHO. The “suggestions” referred to by Repacholi are more than such; independent studies have drawn actual conclusions, and not mere “suggestions”. Another example of this kind of pre-determinism is when Repacholi told a news conference that although a study was needed on the effects of low-level exposure over longer periods, he was confident existing international standards were adequate.

Repacholi’s stance sometimes bordered on an outright denial of the facts. He admitted that “questions have been raised as to whether mobile phone use leads to brain or other head and neck cancers because you have a radiating antennae very close to the head,” but then went on to state that “there is no scientific evidence for that.” Not only does this statement play down the possible risk, it’s simply not true. Much scientific evidence does exist; again, it’s a question of putting this evidence into proper perspective.

Some of Repacholi’s views also stand in clear contradiction with those of other official organisations. For instance, he noted that present scientific evidence can’t be accurate given the time difference between the existence of cell phones, which have been around for less than 10 years, and the incubation period for cancer, which can be up to 15 years. Thus, in order to further delay dealing with the issue at hand, he concludes that more studies need to be set up so that if an impact is to be proven, it can be found in a “reasonable time”.

Yet the fact remains that studies on probable causes at low levels of RF radiation were carried out as early as the 1960s. Dr. Allan Frey, a researcher and consultant based in Potomac, MD, distributed a paper presented at a Food and Drug Administration (FDA) symposium in 1969 concluding that a link between microwaves and headaches was real, but requires verification. This observation, made over 30 years ago, contradicts Repacholi who maintains that not enough time has passed and that low levels are proven safe. [6]

To make matters worse, no one has yet dared to test Frey’s hypothesis. One reason is because of what they might find. Frey was not only convinced that the radiation from cell phones causes headaches, but that it causes microwave-induced leakage through the blood-brain barrier. “Headaches may only be the most obvious indicator of what is going on biologically,” he warned.

While industry and international organisations pursue studies which are focused on damage control in deference to gathering scientific evidence, true research is laid to waste on the sidelines. To put it simply, no one wants to fund this kind of research. Though long promised WTR research funds, many eminent researchers, who take a more scientific approach to the issue as opposed to a diplomatic one, are still empty-handed. Even the FDA in the US has offered but a minimal contribution. The agency has opted to simply watch WTR’s effort from the sidelines – with a few exceptions.

Meanwhile, to make matters worse, the media has been inundated with corporate spin and “junk science”. The injection of misleading studies helps to further muddle the issue. Dr. Ross Adey of the Virginia Hospital in Loma Linda, California, in a study for Motorola, indicated that digital (TDMA) cellular phone signals had a protective effect against brain tumor development in rats. Yet a

parallel study on FM waves, which is of more concern to cell phone users, wasn't elaborated on. Adey admits, however, that "every signal may have a different effect." [7]

Likewise, Dr Joseph Roti Roti of Washington University in St. Louis came to the conclusion that his experiments did not show DNA breaks reported by Lai and Singh. This, too, was because he had used a different type of microwave radiation and an in vitro assay rather than live rats. Yet he admitted he didn't make the decision about the signal. "I did not pick it," said Roti Roti, "talk to the lawyers who wrote the contract."

Not surprisingly, when attempting to trace the source of decisions, it's difficult to determine who's responsible. There's no transparency within the process, which is one of the hallmarks of junk science, as opposed to true research. In the case of Roti Roti's study, for example, one of the lawyers involved, Charles Eger, declined to say who had picked the experimental conditions for Roti Roti's study. "I'm not familiar with the contract," Eger told *Microwave News* in an interview. "I'm not a practicing lawyer; I'm a policy guy." [8]

As a result of all the spin and junk science, the mass media – when not in the direct employ of cell phone industry – is taken along for the ride. A typical news item, early on when the issue of RF radiation was still relatively new, was Sylvian Comeau's report *Cellular phone under the microscope.* [9] The title of the report makes it look factual. Yet already within the first paragraph the issue was framed within the confines of a "cellular phone scare", with the conclusion obviously being that "numerous studies had already concluded that they were safe." The article then goes on to trumpet the industry view that "safe exposure levels to EMFs have already been quantified, and the fields produced by cellular phones are well below this level," which is contrary to the scientific evidence available, even at that time.

Similarly, Comeau asserts the industry claim that cellular phones are "considered safe". His statement that "the biomedical community is trying to determine whether long term exposure, even to these lower levels, is likely to cause subtle effects which have not yet been identified" ignores the fact that the effects are already known; instead, what is of concern is how prolonged use will affect humans.

Comeau finishes the article by adding a little muddle to an already skewed report, by noting that research may also address many other concerns besides the rumoured tumour connection, such as the effect of cellular phones on hospital equipment. Not only does this lump two totally separate issues into one basket (RF radiation and communications interference), it makes the whole issue blatantly obvious that it's not worth looking into it further.

Although some may excuse Comeau's apparent ignorance to the fact that general knowledge of technical issues were harder to come by in those days, more recent articles on the subject fare not much better. In a *Wired* article reporting on the results of a WTR study called "Cell Study: Hazards Are Real" (June 21, 1999), Chris Oakes noted that prior to the WTR results, "the studies were largely speculative", which is simply not true. Moreover, throughout the piece he routinely

fails to critically examine such claims. Furthermore, the tone of the article is clearly biased toward the cell phone industry through the careful use of language. For instance, he writes that "the latest findings *suggest* a correlation between cell phone emissions and a *slightly* higher incidence of human brain tumors, cell growth in human blood micronuclei, and DNA breakage in rats." [10] Not only this, there is scant coverage of the other side, with opposing views presented mostly as those of "activists" when in fact many of these "activists" are eminent scientists themselves.

Oakes' article is noteworthy in that it provides clear examples of the tactics employed by the industry to muddle the issue. In addition to stressing that "while the findings are far from conclusive", a quote from Paul Joseph Morrissey, the head of Motorola's biological research program, was a classic in terms of doubletalk: "we saw both effects and no effects, and we need to replicate [the studies] to assess the results," said Morrissey as he tried to downplay the findings.

Apart from all the corporate spin, junk science, and media manipulation, what also indirectly contributes to muddling the issue is the advantage some companies are taking to exploit the issue for their own economic benefit. By doing so, they end up belittling the issue. For instance, an on-line advertisement for the "Protector" anti-radiation health cover for cellular phones makes various spurious claims. One is that a cover made from leather and a "special" material can reduce exposure to harmful radiation by 95%. The fallacy should be obvious: if so much of the transmission is indeed filtered out, then your cell phone probably doesn't work properly either.

Often, those hoping to cash in on other people's misery are just as guilty of spreading inaccurate information as industry spin doctors. As with Comeau's article, the advertisement for the Protector case generalises facts and muddles the issue by mixing two separate issues together – that of RF radiation as a health risk, and that of cellular phone interference with other communications equipment. Thus, the claim that "it is a regular thing to see the new signs in the hospitals and airplains [sic!] that forbid the use of cellular phones" has nothing to do with "protecting your brain". [11]

In the end, at issue is not only that prolonged cell phone use can be hazardous to your health, but that there are no adequate warnings of the dangers it imposes. Admittedly, very few products we use nowadays are risk free. Yet this doesn't mean cell phones should never be used and are not useful. As with household appliances most of us use everyday (such as microwave ovens and television sets) for which warnings, information and suggestions for proper use are all provided, what is needed for cell phones is more information and less spin so consumers can make well-informed choices and know about the risks they face. Although industry has a phobia over infantcide, there is no need to throw the baby out with the bathwater.

Hype over Health

In addition to muddling the issue, concern over the safety of cell phones have been drowned out by the hype surrounding mobile communications. With the

advent of third generation mobile phone technology (better known as 3G technology), this hype has become more prevalent. The reason for this is not only to keep the "revolution" going, but big telecom operators (and, subsequently, the financial institutions which lent them money) need 3G technology to be a resounding success in order to recuperate the enormous amount of capital invested.

Aside from this, some argue that the current grab for "electrospace" is to cybercapitalism what the enclosures movement was to capitalism – the edifice on which all future enterprise must be built. Not surprisingly, one of the main motivating groups behind this modern enclosures movement is the UMTS forum. [12] In effect, as Phil Graham pointed out in a post to *Nettime*, what this amounts to is the establishment of a global, privately owned broadcast space. [13] He goes further, adding that control of eletromangentic space is one of the most serious issues of our age, yet awareness of its significance seems minimal. Radio spectrum is a non-depletable, concrete resource upon which any global knowledge economy, if it is to exist at all, must be built. Indeed, it had laid the foundation for US dominance after 1945 in world telecommunications and the formal empire it has maintained.

Whatever the primary reason for the focus on 3G technology, as with all the hype surrounding computer and Internet technology, mobility is now regarded as the dominant trend of the future. The introduction of increasingly high-speed mobile networks, which will enable cell phones to display full-colour, high-resolution video, is regarded as the "killer app" which will breathe new life into what has become a stale revolution.

Because 3G technology is supposed to be an integral part of this next phase, the trend in so-called "network research" has concentrated on blurring the distinction between computers and telephones. Thus, as a *Sunday Times* article in 1999 reports, "phones and internet services fuel each other's growth." [14] To its credit, the article goes on to note that "as with all revolutions, there are reservations. Health concerns about mobile phones are unresolved, with microwave radiation linked in one recent study in Sweden to increased tiredness and headaches."

Some see the blurring of computer-mediated communications and telephony as a shrewd strategy on the part of large telecoms and cell phone operators alike. By maintaining such a focus, they are both looking to "capture" the Internet access market, or at least a large portion of it. For large telecoms, one observer noted: "internet protocols look as much like the telephone net as possible to make it easier for dinosaurs to survive meteor strikes." [15] Cell phone operators, meanwhile, with their relatively huge subscriber base, are in a position to topple both free and subscription-based ISPs by launching portals tastefully garnished with existing rich user data. [16]

Yet it's not only business interests that have high hopes for 3G technology. Governments also look to 3G technology as the latest chapter in the evolution of the "information society". The US has realised as much: toward the end of the Clinton presidency, an Executive Memorandum issued on October 13, 2000, charged the regulatory authorities in the US with the responsibility to immediately solve the problem of allocating additional spectrum. Accordingly, the Federal

Communications Commission (FCC) had been directed to develop rules to identify and auction off this spectrum for third-generation wireless services as soon as possible. As Clinton remarked when he announced the memo, "if the United States does not move quickly to allocate this spectrum, there is a danger that the US could lose market share in the industries of the 21st Century." [17]

Yet for the US, this is easier said than done. There are many other barriers to the uptake of wireless in the US than spectrum allocation. Most analysts agree that the penetration of mobile phones is foremost being held back in the US as a result of competing incompatible systems, which makes roaming problematic. Another is the US practice of charging mobile phone customers for the calls they receive, as well as those they make.

While the US places the importance of cellular technology on its need to maintain its dominant position, others see it as a way to come up to speed on the infobahn. Japan is often looked to as a case in point. Despite all the technology at its disposal, Internet penetration in Japan is very low, lagging behind the US and Europe. Cell phones, on the other hand, are just the opposite: the island nation is among the top in terms of cell phone use. As a new generation of mobile devices with Internet capabilities becomes available, many pundits believe that Japan will soon be on top in terms of Internet use. Already, the i-mode service, which allows users to log onto the Internet and charges them according to the volume of information downloaded, is seen as a taste of things to come.

For Europe, the development of cellular networks is also considered very important, so much so that the EU's political, economic, and research policies are all geared toward exploiting this trend for all its worth. "The benefits of the new economy will only become apparent when we attain the critical mass of Internet penetration on the European market," Commissioner Liikanen stated when presenting the *e-Europe* project last year. [18] With the world's most advanced mobile communications system and highest per capita cell phone ownership in the world, European leaders feel that this is the one avenue by which Europe can surpass the US in terms of economic growth. According to Liikanen, "in the field of mobile telecommunications Europe is really leading. It shows that we can seize the opportunity." He was quick to add, however, "but we have to move fast with these things." [19]

At present, statisitcs seem to back up the European position. About twenty percent of Europeans already use mobile phones and between 1-2 billion short message service (SMS) messages are exchanged each month. According to some estimates, m-commerce will boom in Europe by 2003. Then, it's estimated that a third of Europeans will access Internet services via cell phones. [20] What is more, wireless data service revenue in Europe will increase by a whopping 1366% between 2000 and 2008. It has been predicted that total revenue for wireless voice services will hit $157 billion by 2008 and total revenue for wireless messaging services will hit $57.8 billion by that same time. Meanwhile, the global use of cellular technology is expected to rise to 1.7 billion users by 2005. [21]

The future hope for Europe is primarily based on successful past experiences. European industry has built on the competitive advantages gained during the development of the second generation digital mobile cellular system (GSM) and, in

1997, became the world's largest service provider, overtaking the US. The EU is now set to maintain its lead in telecommunications technology with the 3G system known as the Universal Mobile Telecommunications System (UMTS), and companies are joining forces across Europe to ensure they take advantage of new developments. While UMTS is only one of several 3G systems, it looks set to become the industry standard. A commercial UMTS network is expected to be be fully operational by next year.

Government involvement in this is readily apparent. In 1998 the European Council and Parliament adopted a decision paving the way for the rapid and coordinated introduction of compatible UMTS networks and services in the EU by the year 2002. This was followed by a cooperation agreement signed in 1999 between the UMTS Forum and IPv6, the worldwide consortium of Internet industry players founded to promote the Internet Protocol, version 6.

Prior to the auction of 3G licenses last year, the European Commission (EC) called on Member States to negotiate additional radio spectrum to allow further growth of third generation mobile telephony. The EC wanted to ensure Europe maintains its lead in mobile telephony, and it was feared that without sufficient spectrum space, the jump to a mobile Internet would be hampered. This effort was then followed in June 2000 with an agreement between 150 countries in Istanbul during the World Radio Communications Conference to allocate additional spectrum for 3G networks.

Unfortunately, concern over the success of UMTS is such that the EC appears willing to forego public health for the sake of economic interests, as well as "supporting the communications revolution". [22] For example, a new directive regarding the approval of telecommunications terminal and radio equipment adopted by the European Council was established in early 1999 which follows a "light" conformity assessment regime, one based upon the principle of a manufacturer's declaration. [23] This means the assessment and approval of such equipment has been shortened.

The argument in support of this directive is that faster technological progress and the shorter time it takes to develop such equipment requires a "new approach", which means radically simplified legislation. However, relying on a manufacturer's declaration that a product is safe is foolhardy; because of obvious vested interests, there is no guarantee of an objective assessment. If anything, it's a clear case of a conflict of interest.

Such radically simplified legislation undoubtedly means that products will enter the market which haven't been adequately tested. In particular, since the health risks of prolonged cell phone use has not been adequately dealt with, this means that the principle of a manufacturer's declaration has taken precedence over the precautionary principle.

At this point, one might argue that even if prolonged cell phone use is a health risk, the nature of 3G technology would actually minimise such risks. Since information is received audio-visually through the screen and tramsmitted via a keypad, the risks associated with holding a powerful electronic transmitter so close to the brain no longer applies. Moreover, ways have already been devised to keep

the hand piece and antennae away from the head. The use of earpiece and mouthpiece cellular phone attachments is a prime example of this.

Yet such attempts have so far failed to adequately address the issue. Earpiece and mouthpiece cellular phone attachments have not become all the rage as industry experts had hoped. Although these extra little gadgets are claimed to make cell phones "safer", they also tend to make personal interaction more difficult.

In addition to this, there are alternative dangers to using cell phones than just radiation exposure. Medical specialists have noticed an upswing in cases of impaired muscular coordination, apparently caused by the use of Palm Pilots and similar hand-held devices [24]. It seems that writing characters each on top of the last can induce long-term confusion in some individuals. Subsequently, such people find it nearly impossible to write on paper, producing instead a baffling doodle.

Aside from all this, there is a more fundamental problem. Concentrating on 3G takes the focus away from the telephonic use of cell phones. In other words, it's still a dangerous product in terms of radiation exposure.

The approach by industry to the problem is still primarily based on the "thermal-only" argument of cell phone radiation; the development of earpiece and mouthpiece attachments being a case in point. As Stewart Fist pointed out, "the 'thermal-only' argument is dead." What is more, the conduct of the experiment in the *AHR Study* not only looked into the effect of direct exposure, but also raised questions about the potential for cell-phone handset radiation to effect people nearby, better known as passive exposure.

On top of all this, it remains to be seen whether 3G will even work in the first place. The precursor to 3G technology, Wireless Applications Protocol (WAP), has been a dismal failure. When WAP first made headlines, it was hyped as the next stage in the "Internet revolution". The global business television network, CNBC, even included a special feature segment called "WAP Wednesday" in order to promote it. Since then, WAP has fallen into utter disgrace. Subsequent commercials on CNBC about emerging technologies ended up asking whether they would be "wasted like WAP."

Lessons of the Past

Without a doubt, there's still a lot we don't know about how cell phones might affect us. What we do know is that they are powerful electronic transmitters, and have been linked with DNA damage and other such problems. Because of possible health risks associated with holding cell phones close to the head for long periods, the cell phone industry has conducted a sophisticated – and so far very successful – campaign to accentuate the positive and silence anyone who raises the possibility that their product might have a problem.

In terms of corporate behaviour, this is clearly a case of history repeating itself. The cell phone industry, and to some extent government agencies, have been acting the same way as in the past when other industries were confronted with the

knowledge that they were marketing a product that, for all intents and purposes, could be labelled as dangerous and unsafe. The best illustration of this is that of the tobacco industry.

The cumulative balance of evidence against cell phones is about the same today as that against cigarettes twenty years ago. The tobacco industry held sway over much of the research into the health effects of smoking for many years – and blocked good research. Incidentally, the "men aren't rodents" ploy mentioned earlier comes from the tobacco industry, where it became so commonly used as a way to down-play the importance of health research that it acquired the name "The Hockett Defence". [25]

As with tobacco, there are several lines of defence being used (and will be used) by industry to shelter themselves from criticism. The first is to simply dismiss preliminary early studies. When this quickly becomes untenable, research results are then hidden from view, as the tobacco industry had done in the 1960s to avoid a probe launched by John F. Kennedy's administration in the US. When hidden research can no longer be denied, the third line of defence is to play for time. Against some of the more resounding claims, cosmetic changes are introduced in order to allay fears. For the tobacco industry, this meant putting filters in cigarettes; for the cell phone industry, it has meant the introduction of cryptic warnings, such as not to hold the device too close to the head.

While all this is going on, a subtlety aggressive advertising campaign is undertaken to increase the number of consumers and, more importantly, have them addicted to the product. To this extent, direct advertising is geared foremost to the young and usually equates the product with social success and acceptability.

For the tobacco industry, accomplishing this task hasn't been too difficult since the product itself is naturally addictive. For the cell phone industry, it requires a little more effort; for instance, when phone companies give away free cell phones to get consumers hooked on their service. [26]

With such a campaign in hand, the spin doctors can then avoid the fundamental issue – i.e., health and welfare – and focus on economic aspects instead. Thus, after having successfully forced the product on to the market and expanded its consumer base, industry is then able to acknowledge health issues – to a certain degree – knowing that people and the economy are too addicted to the product anyway.

Finally, when the overriding amount of evidence makes even this position untenable, a threat veiled in the form of a plea is made, in that litigation will destroy the business, and society will then have to pay the economic price. This, even though the business is destroying the health of society which, in turn, places its own economic burden in terms of loss productivity and an unnecessary strain on government services, namely health care.

What many within industry don't realise is that adopting such an approach for the sake of short-term gain is ultimately self-defeating. The breast implant industry provides a case in point. It was nearly destroyed because of deceptive

practices by a few manufacturing companies and the arrogance of plastic surgeons. In the end, they almost destroyed their own market by avoiding research and trying to manipulate public opinion through tobacco-science. Ironically, it seems little has been learned, as an attempt is underway to make breast implants acceptable again.

Corporate history is replete with such examples. Health concerns are swept aside for the sake of profit until the charade can no longer be maintained. The makers of leaded gasoline, for example, systematically suppressed information about the severe health hazards of their product for decades. These health hazards include, among other things, lower IQs and learning disabilities, hyperactivity, behavioural problems, high blood pressure, and cardiovascular disease. According to Mokhiber and Weissman, "these companies knew from mid-1920s that leaded gasoline was a public health menace, yet they went ahead and put lead in gasoline anyway, to prevent engine knocking." [27]

The fear of losing business and profits is based on a short-sighted view of the situation; skirting around health concerns ultimately defeats the purpose. Yet, despite lessons from the past, the cell phone industry is still intent on muddling the issue for the sake of pushing through a "wireless revolution". Little do they realise that the practice of ignoring fundamentals will eventually boomerang on them once averse health effects begin to make themselves known – and felt.

Conclusion

Cell phones are an intense source of high-frequency magnetic fields that is held very close to the brain. Studies have investigated various health hazards – reduced fertility, brain tumours, memory loss, behavioural changes, and damaging effects on a child's development. Naturally, this has raised concern and fear about the effect of cell phones on human health.

Industry scientists claim to have no proof that cell phones are harmful, saying that there is as yet insufficient scientific basis for confirming or disproving the claims made by the likes of the *Adelaide Hospital Study*. Nevertheless, many of these same scientists are not prepared to commit themselves to their absolute long-term safety.

In an attempt to remove further doubt, the research arm of the cell phone industry, the WTR, has initiated a feeble attempt to look into the problem. Yet research conducted by the WTR is mostly safe and reasonably non-controversial. For accurate results, control of the direction of the research must be taken away from the cell phone industry. As Stewart Fist pointed out, "any research that is not perceived as independent is pretty much a waste of time."

Already, there exists much evidence to point to the harmful effects on human health of the extensive use of cell phones. Unfortunately, much of this research has been discounted because the results of the studies have not been replicated. This is because when such disturbing results have become known, the industry has consistently failed to fund replication studies.

When first confronted with the lawsuits and the resulting publicity, the cellular industry mounted a public-relations offensive, claiming at news conferences and in news releases that there were thousands of studies that proved the safety of cellular phones. Yet the industry has largely put forth studies that looked at the effects of radio waves outside the cellular frequency.

Meanwhile, industry regulators who are supposed to be acting in the public interest have clearly failed to do their part. None of the organisations in question have much credibility. They are run by people who have long worked as industry lobbyists, or who are employed by government departments which are widely believed to have been "captured" by the industry they are supposed to regulate.

Regulators often see their job mainly in terms of keeping information of adverse cell-phone problems from the media and the public. Right throughout Europe, the push to develop GSM digital phones as a world-wide standard has taken precedence over the health and safety of the public, because this is potentially a billion dollar business.

When it comes to corporate abuse, it's almost taken for granted that it is primarily the US which facilitatets industry to push ahead a pro-business agenda and to silence critics. Yet with the issue of cell phone radiation, this is not the case. It's Europe which has done little in terms of research and critically aprraising the product. The reason for this is quite obvious: cell phones are key to Europe's global economic strategy, and the fact that Europe is the leader in the field has made politicans and policy makers unwilling to look too closely or critically at the matter, for fear of jeopardising Europe's one economic advantage over the US and Japan.

Despite all this, there has been some progress on the issue. Last May, British experts released a critical report regarding the effects of radio-frequency radiation on biological functions, especially for the brain. [28] And this year saw the launch of the first large-scale international epidemiological study into the health risks of cell phone use. This study, known as the Interphone project, will involve 17,000 test cases and analyse the risk to organs which could be thought to be the most exposed. The initial results are expected to be available at the end of 2003 or the beginning of 2004. [29]

At this point in time, what is needed is a comprehensive precautionary approach to the use of cell phone technologies. This doesn't mean an absolute ban on the use of cell phones but, rather, requires government and industry officials to fully inform the general public as to the potential risks. But even more important than this, there is a desperate need to have continued independent research, one that is not influenced by economic or political considerations, but by scientific standards alone.

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10. Emphasis represented by “*” is my own.

11. The fact that this advertisement contained, in addition to several factual and logistic errors, numerous basic spelling and grammatical mistakes, suggests that this on-line advertisement is most probably a scam.

12. http://www.umts-forum.org/

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14. cf.
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A similar view is also shared by Gordon Cook, and has been a recurring theme in his on-line publication *The Cook Report*, which can be found at http://www.cookreport.com/

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24 cf. http://www.sfbg.com/wire/45.html

25. The term was named after Dr. Bob Hockett, chief scientist at the Tobacco Institute, who sent out the phrase in a memo to all cigarette company executives, suggesting that it was the best way to counter adverse health claims.

26. Sprint started the process offering access to certain Internet functions on their digital cellular phones. Soon, non-telecoms followed suit, such as Dell with the BlackBerry device which can attach to LANs like a pager connects to service.

27. Mokhiber, Russell and Weissman, Robert, “The House of Butterflies”, *Focus on the Corporation*, March 13, 2000. http://www.corporatepredators.org

28. The *IEGMP Report on Mobile Phones and Health*, better known as the *Stewart Report*. http://www.iegmp.org.uk

29. Researchers will look at the past record of cell phone use among all patients showing new cases of tumours in the participating hospitals, and compare these cases to a control group. Scientists will analyse around 6,000 cases of brain tumours, 600 parotid gland tumours (a salivary gland in the cheek) and 1,000 tumours of the acoustic nerve (running from the ear to the brain). Including members of the control group, the total survey population will be 17,000. It will be possible to establish the importance over time of exposure to close magnetic fields, specifically those emitted by the radio frequencies of cell phones, and to study possible correlations with the occurrence – or not – of cancers.