TECHNOLOGICAL CHANGE AND ITS IMPACT ON MEDIA POLICY PLANNING*

Peter Wilenski

In the media there is a complex interaction between technological change, markets and policy. The policy questions that arise are complex but not insoluble. Who should provide the technological infrastructure? Is economic, social or technical regulation required? If so, what is to be regulated? If technical regulation is required, what are to be the technical standards? We are no longer simply reacting to technological change but are actually planning ahead of change.

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Technological change to many of us is a force which is driven by scientific imperatives, over which we have little control and which will inevitably change our lives for better and for worse whether we like it or not. There are certain large elements of truth in this picture and indeed I might in passing give a commercial plug for the Australian Commission for the Future which was established largely so that Australians would realise that they have a choice about future technologies and to assist them to develop ways to exercise that choice.

At the same time, this picture of scientifically driven technological change inexorably taking over our daily existence leaves out many complexities. Technological innovations themselves are not simply the product of value-neutral, curiosity-driven scientific research — or scientific accident — but are also driven by such factors as commercial opportunity and defence requirements. And once major technological change has occurred, it is not immediately translated into applications which affect our lives: both market forces and public policy intervene to determine the speed and nature of such applications.

My task today is to discuss this process by which technological change affects the development of public policy towards the media and in turn how public policy helps to determine the applications of technological breakthroughs.

I am not here to sell you anything. However, if there is a message in what I have to say it is this: Technological determinism is an

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inadequate explanation for progress and change — or the lack of it — in the media; market forces clearly play an important role but government also has an ongoing responsibility to uphold the public interest. Technological change makes this role increasingly difficult and sometimes renders policies out-of-date almost as soon as they are implemented but the responsibility of policy makers in this area, nevertheless, remains the same as in any other: to work out who are the winners and who are the losers from any policy change, to determine the effect on economic efficiency and to try to determine where the public interest lies.

The Green Report on the structure of the Australian broadcasting system in 1976 addressed itself to this issue in the following way. It argued that future development of the broadcasting system should be "more consciously directed to the achievement of social and cultural goals than it has been in the first fifty years. There will be increasing justification for dissent if, at this stage of our development, we allow technology alone to determine our priorities. It is well recognised that a number of new services which are now technically feasible may not be immediately compatible with our social needs or economic capacity".[1]

TECHNOLOGICAL DETERMINISM

One approach to policy making we could take is to picture the average household in the year 2000 with all the communications wizardry installed and simply do our best to facilitate it happening. After all, the basic technology for anything that is likely to be in home use in the next decade is almost certainly known to us today and indeed we could fairly rapidly move to the complete 'electronic cottage' providing a range of interactive telecommunications service, such as videophones, electronic newspapers, home shopping and banking, facsimile transfer, pay TV and so on.

Indeed there were many predictions twenty years ago that this 'electronic cottage' which the ordinary person would not have to leave in order to obtain and react to all the information she or he required would already be with us today. The fact that it is not is testimony to the inability of experts to predict what people want and what they are prepared to pay for. Evidence to support such inability abounds in the communications and information field. There are the executives who advised Western Union against investment in Mr Bell's newfangled telephone because "the public simply cannot be trusted to handle technical communications equipment"[2] and the forecasters who told IBM that the US market for computers was about twelve machines. It is also salutary to reflect that in the 1970s the professionals regarded video disc as superior to videotape, in terms of fidelity, clarity and flexibility. Yet the consumers chose tape; what they really wanted was to 'time shift' — to record programs off-air and replay them at their

own convenience — and technical superiority was not the relevant criterion.

Ideally then, other things being equal, we should whenever possible create a policy framework in which consumers themselves decide what services they need using which technologies. Sometimes we can do this. Video cassettes are a good example. We can stand aside asnd allow different types of recorder with different systems (VHS and BETA), different tapes and different contents to compete against one another with very little government regulation — though even here we are concerned with such issues as encouraging the local electronics industry and with content regulation in the form of limitations of the portrayal of violence and sex.

However, usually the luxury of a hands-off attitude is not available to us. Media markets are imperfect and oligopolistic and it is not easy for consumers to hold sway. Much of the new technology — whether fibre optic or satellite — is extraordinarily expensive and in a market the size of Australia's often allows for only one supplier. Space on the spectrum is limited and has to be rationed by one means or another.

PUBLIC POLICY QUESTIONS

Thus as a new technology is developed it represents a public policy challenge. It may have the potential to undermine long standing institutional arrangements or the solutions to previous policy problems, solutions which were reached only after hard fought battles among the interests involved and which no one is now anxious to see disturbed.

Let me mention four of the central policy questions that almost always need to be asked once it is clear that we wish to, or that we have to, introduce or adapt to some technological innovation. Although I list these questions in some logical order the fact is that usually they cannot be serially addressed. The answer to any one of the questions affects all the others and in practice we need to answer all four simultaneously calculating which set of answer best serves the public interest. The questions are:

- Should the government or the private sector provide the technological infrastructure?
- Should we have a free market or is economic, social or technical regulation required?
- If economic or social regulation is required, what is to be regulated?
- If technical regulation is required what are the technical standards needed?

Let me say something briefly about each of these questions before turning to a current concrete example, namely the possible introduction of Pay TV.

Should the Government or the private sector provide the technological infrastructure

This is a question which is becoming increasingly difficult. It raises questions of ideology, efficiency, natural monopoly, and equity of access. Some decisions are made quickly enough with little agonising. Thus for example there was no question but that the basic fibre optics telecommunications network which will become increasingly important for the delivery of various forms of media would be laid down by government through its agency Telecom. On the other hand, no one would suggest that the program production technical facilities of private TV networks or the technologically advanced equipment for the printing of newspapers should be installed by government. But there has always been a grey area — for example, the ongoing discussion on both environmental and cost grounds, as to whether each broadcaster should build its own private transmitting facilities or whether there should be common use of government owned facilities.

As time has gone on, as information and communications technology has become increasingly inseparable, and as public investment capital has sometimes been scarce, the discussion has become more complex. A major recent example of intense public debate was the debate over the ownership of AUSSAT (which at present is used mainly for broadcasting purposes). As new technologies become more difficult to type and to classify technical arguments will increasingly be added to the traditional ones of natural monopoly and equity of access.

Should we have a free market or is economic, social or technical regulation required?

If media services delivered through new technology are to be provided by the private sector, regulations should be kept to a minimum so that consumer preferences can dictate the outcome *unless* (and this is a pretty big proviso) there is a wider public interest to be served. Films and books represent two types of media which have been left largely unregulated apart from censorship classifications in the former case and the encouragement of an Australian industry through various measures in both cases. However when it comes to the more news and information oriented media — newspapers and especially radio and TV — we have traditionally (and in my view, for the main part correctly) considered a variety of public interests ranging from limitations on concentration of ownership and control, to requirements for Australian content.

The form and extent of regulation is however regulated to the technology involved in a way that will now cause us difficulty. There, for example, have developed within the communications group of the Department of Transport and Communications and the relevant industries, three very different attitudes towards communication

regulation based on three different applications of essentially similar technology, each I might add, with its separate legislation.

First, free-to-air broadcasting regulated under the Broadcasting Act is a highly regulated and oligopolistic system, which is strongly influenced by concepts of the public interest. Broadcasters are protected from the chill winds of the market place, but have had to accept an intrusive regulatory regime directed not only to matters of content but also to technical matters.

By contrast, radiocommunications under the Radiocommunications Act has had a very liberal regime. Although there is a range of technical regulations, and these are policed quite energetically, generally speaking the Departmental culture can be summarised as: have frequency, will license. At least until very recent times, radiocommunications licences have been issued at low cost over the counter in dozens of State and regional offices, and there has been minimal interest in regulating content.

At the other end of this continuum, telecommunications policy has been an area based on the concept of 'natural monopoly'. There are a considerable number of regulations, but these have been administered by the providers themselves — principally by Telecom. Like the broadcasters, Telecom has had to accept a range of obligations as the price of their privileged position, most of them flowing from the principle (briefly summarised) of 'universal access at an affordable price'.

Unfortunately these neat divisions are crumbling due to technological change, or more particularly the phenomenon usually termed technological convergence though it might better be called 'applications convergence' since it is the use of the available technologies which is overlapping, not the technology itself, which is and has always been basically common. Broadcasting-like services (i.e., services which deliver to the client the same product as TV or radio which is broadcast free-to-air) can now be delivered through systems such as satellite or multipoint distribution services (MDS) or on the telecommunications network; cellular telephones using radiocommunications frequencies are directly linked into the telecommunications network. It is no longer possible because of technological change to regulate media on the basis of the means of delivery and we are busily re-thinking the concepts, the approaches, and the various pieces of legislation.

If economic or social regulation is required what is to be regulated?

There are three different types of regulation which broadly speaking fall under the heading of economic or social regulation and on each of which technological change is having an impact.

The first type of regulation — market regulation — is basic. For example, it limits the right to broadcast to holders of a licence, restricts the number of licensees and determines the methods by which those

licences are allocated and what price is paid for them. Such regulation is based on the view of the broadcasting spectrum as a scarce public resource. Thus government must decide how to allot the limited slots available and what restrictions might be put on their use in the public interest. Furthermore, very heavy investments in broadcasting licences and facilities have now been made by licensees on the basis of this system and the expectation it would continue, and thus the 'commercial viability' of new and existing licence holders is an element in decision making.

The new means of delivery of broadcasting-like services whether cable, MDS or DBS, however, open up at least the longer term possibility of a multiplicity of 'channels' and the end of tyranny of spectrum shortage. Thus the system of regulation which was built on one technology faces the potential at least of being undermined by the development of others.

The second type of regulation relates to limitations of concentration of ownership and control and related limits on foreign ownership. Such limits are as you know quite extensive in Australia with limitations both on audience reach and very severe limitations on cross-ownership as between TV, radio and newspapers. As we move into the world of electronic newspapers and new forms of entertainment and information services once again we will have to adapt our forms of regulation if we are to maintain our aim of preventing too great a control by one individual or group of our information sources — though it may be that technology as well as creating a problem may find us the beginnings of a solution if the sheer multiplicity of media outlets ensures competition.

The third form of regulation is regulation of content in order either to promote specific program objectives such as quality or diversity or fairness or to promote specific social objectives such as the maintenance of Australian culture and identity, or children's education, or the discouragement of violence or of smoking or of unusual sexual practices before 9.00 p.m. The basic reason for this content regulation lies partly in the use by the media of public resources but more fundamentally as far as public expectations are concerned, in the pervasiveness of broadcasting media, their perceived impact and their ready accessibility to children of all ages. The question that changes in technology pose of course is whether broadcasting-like services *not* delivered on the broadcasting spectrum should or should not also be subject to content regulation.

If technical regulation is required what are the technical standards needed?

The question of technical regulation is once again driven by the concept of scarcity and the utilisation of public resources. Those allocated a broadcasting frequency and investing in it have the right to expect that they will be able to broadcast in their service area free of interference. But, of course, these are not purely technical matters. In Australia, for

example, we have opted to provide high quality reception of a limited number of services throughout a fairly large service area, as against the US approach of allowing a greater number of broadcasters within any given area but subject to far more interference. Furthermore, apparently technical decisions can greatly affect the range of services available to us. For example, the disastrous decision in 1961 to permit TV broadcasting on the band reserved internationally for FM radio services greatly delayed the development of high quality music radio in Australia.

Not all technical regulation, however, is related to the spectrum. New technologies are often developed in the market place and compete with one another. Sometimes, as with VHS and BETA we can let the market place decide between them but sometimes this would involve considerable duplication of facilities and, it could be argued, a waste of resources. Government then has to decide whether an interventionist public policy in the form of technical regulation would better serve the public interest. These are not easy decisions but a typical example was the decision on whether there would be a single TV transmission system and which of PAL, NTSC and SECAM would be the standard. Letting the market decide would have run the risk not only of investment by TV stations in competing systems, but in the resulting need for viewers to own expensive television sets capable of receiving three different systems. Furthermore, such an approach would have wasted spectrum and created a planning nightmare.

A similar issue may well arise with the development of high definition television (HDTV). HDTV requires considerably more bandwidth than conventional TV but provides pictures which are as brilliant and colourful as 35mm film. However, if it became the new standard, it would render obsolete both much of our terrestrial transmitting systems (it would require cable or satellite broadcast) and our TV receivers. HDTV is as yet nowhere in the world widely commercially available and I have already referred to the inability of experts to predict public demand for new technologies; however most experts do believe that HDTV is the TV of the future and if and when it does arrive we will be faced with a difficult choice. The question in this case is not simply (if a single international standard is not agreed upon) whether we should use the Japanese system (totally incompatible with present equipment) or the European (partially compatible) or the yet to be developed American, but when should *any* type of licence be issued given that HDTV will involve such a massive new national investment in TV equipment and have a very considerable impact on our local industry and our import bill.

CASE STUDY: PAY TV

I mentioned that I would try to illustrate the complexity of intertwined technological, market and public policy considerations with a current

example namely the question of Pay TV. As you may know, there is a legislative moratorium on the introduction of Pay TV before September 1990 but the Minister has ordered a review of options for its possible introduction so that an informed decision can be made well in advance of that date.

In the case of Pay TV, intertwined with the four questions that I have already mentioned is a fifth one namely which technology should be used? This is because Pay TV is a service where policy development is belatedly catching up with the technological development so that we now have, in fact, a number of delivery systems to choose from. Those among you with a technical bent will probably know that the Zenith Radio Corporation first began to develop the basic technology for Pay TV nearly sixty years ago; certainly by 1968 it was possible economically to scramble television signals (whether radiated or via cable) then unscramble them for subscribers, and this is the essence of Pay TV. It is a relationship between program provider and customer, whereby the customer pays specifically to receive a selection of television programs at a time of her or his choice. A variety of technological means by which this trick can be performed have been developed. Both control and program signals can be delivered using conventional television channels, or via microwaves, or by satellites, or fibre optic or coaxial cables or a mix of all five: This variety of alternative transmission paths among which to choose adds greatly to the permutations of answers to the other four questions. Technology has widened our choice but has made decision making all the more difficult.

Perhaps before raising some of the issues we should ask why if the technology for Pay TV has been around for at least twenty years, do we not already have it in Australia? One answer is, of course, that we have. Videotape hire is a form of Pay TV; so are video and audio entertainment and information services (VAEIS), whether they are delivered via satellites, MDS, or Telecom cables. However, the critical distinction is based not on technology, but on markets; the moratorium embodied in the Radiocommunications Act expressly forbids the Minister to grant licences related to a *domestic* Pay TV agreement, i.e., an agreement under which a television receiver in domestic premises is enabled to received transmitted television programs for a consideration.

Thus, it is correct that domestic Pay TV has been delayed in Australia for a variety of reasons and that none of these relate to technology. They relate, rather to decisions limiting the amount of investment in TV facilities at any one time, e.g., giving priority to completion of our basic television networks (ABC, SBS and the three commercials), to decisions protecting commercial broadcasters, for example, at a time when they were facing the costs of extending across regional areas ('equalisation'), to decisions maintaining Australian content in program production — or simply to decisions to defer a difficult set of decisions.

Turning now to the first of the basic questions, should Government provide the infrastructure? Perhaps one should first note that Pay TV

is in some ways fundamentally different to existing commercial TV. It has a direct relationship between the consumer and the broadcaster. Existing broadcasters are in the business of selling advertising time or if you prefer, selling audiences to advertisers. Pay TV broadcasters are in the business of selling programs to viewers. What we are concerned with in the first question is how to provide the transmission channel between the two.

For some, the question of government or private ownership of infrastructure is easily settled on the grounds of personal ideological preference. But there are other considerations as well, not the least of which is the final cost to the consumer.

One argument is that consumers as taxpayers have made substantial investments in the existing carriers OTC, AUSSAT and Telecom. Why not ensure that these carriers provide the distribution and delivery systems thereby making a profit on our investment. Which carrier would benefit would depend on the choice of technology. If we opt for direct satellite broadcasting (DBS), then AUSSAT's prospects regarding its proposed second generation of satellites will certainly improve; if we opt for cable delivery, Telecom's investment plans regarding fibre optic cable will receive a considerable fillip. And what about the cost to consumers? DBS would involve direct or indirect costs to consumers for reception equipment; would the cost to consumers of installing broadband fibre optic rather than narrowband cables be greater or less than the cost of DBS?

Alternatively, we could leave infrastructure to the market; Pay TV should be a matter of consumer choice, so let the program providers build whatever system they feel the consumer will pay for. So are we happy to allow the bulk of available microwave frequencies to be used for Pay TV? Would we approve a private satellite system in competition with AUSSAT? (The answer to the last two is, incidentally, a clear no under present policy). Are we happy with private cables strung along telegraph poles? Will we compel Telecom to make its cable ducts available? Will we require the first system provider to sub-let to later competitors? Under what terms? What about environmental considerations whether of cable systems of thousands or of earth station dishes? And will we require providers to use Australian companies and material?

When we have made the whole series of decisions which flow from that first question regarding infrastructure, we can turn to regulation. You will recall that the second and third questions were roughly: 'Should we regulate or have a free market?' and 'If we are to regulate, what is to be regulated?'.

A free market would imply an unlimited number of suppliers unregulated as to content or ownership — a highly unlikely outcome given the present highly structured state of the industry. But assuming more realistically that there is a limitation on the number of suppliers we immediately come up against the complication of choice of

technology. We can provide for competition (i.e., more than one Pay TV supplier) from day one if we use DBS or microwaves; we can only have one supplier in each city if we use broadcasting frequencies (UHF); we can move from initial monopoly to competition in the late 1990s if we plan to use cable.

The effects of existing suppliers, whether broadcasting or VAEIS cannot be avoided as a major consideration and this is complicated by the question of whether Pay TV should be regarded as a broadcasting service or a separate technology and thus whether cross-ownership rules should apply i.e., should broadcast licensees be allowed to own Pay TV licences?

Content issues are also difficult. Since this medium unlike free-to-air broadcasting, rests on the exercise of consumer choice, with consumers buying what programs they want, should Australian content rules be applied as they are in TV or should there simply be access to the same schemes as are available for cinema? Is the correct analogy as to censorship broadcasting (restrictive) or to books and films (liberal)?

And should Pay TV stations be allowed to 'syphon off' from existing broadcasters particular programs, e.g., 'significant sporting events', so that they are not available to non-subscribers? How would this be enforced?

All these are extremely complex policy questions in which technological factors are only one driving force — and in the end perhaps not as important as the interests of the groups involved.

The final public policy question I raised related to technical standards. I have to say that at first blush it seems to me that the technical issues related to Pay TV at least are fairly straight forward since whatever type of transmission was used (unless we went to HDTV) would be based on technologies well established in other countries or simply would be an add-on to our existing systems of regulation. However, here I may be exhibiting either my technical ignorance or my inability to foresee the problems of implementation. As I came to the end of preparing this address I had little time to consult with the Department of Transport and Communications technical experts. Among their other expertise they are expert both in pointing to technological problems which mean that the public policy solution you first wanted was quite impossible and then in creatively devising solutions to the technological problems only they saw — but sometimes in such a way that requires a complete reconsideration of the original public policy aspects.

CONCLUSION

What I have tried to do today is to demonstrate the complex interaction between technological change, markets and policy in the media. The questions are complex but not insoluble. In the end public policy is not principally about asking questions, but about finding answers and

achieving results. I believe that we are no longer, as the quotation from the Green Report at the start of this talk implied, simply reacting to technological change but are actively planning ahead of change looking towards the best outcome for the consumer and the taxpayer.

NOTES AND REFERENCES

1. F.J. Green (Secretary), *Australian Broadcasting: A Report on the Structure of the Australian Broadcasting System and Associated Matters*, AGPS, Canberra, 1976, p. 4.
2. J. Martin, *Future Developments in Telecommunications*, 2nd Edition, Prentice Hall, New Jersey, 1977, pp. 11-12.