On the Frontiers of Technology

Keynote speaker reflects on technology, effects of change, impact on economic, cultural life

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That technology is important is a truism. Every schoolboy and schoolgirl knows that the Industrial Revolution, which began in England during the period 1750 to 1850, was at least partly based on dramatic technological developments in fields such as ironmaking, steam power, coal mining, transportation, new machines for the textile industry, and new techniques in agriculture.

But what is not so well known is first, just how successful the Industrial Revolution was in increasing per-capita income, along with a growing population, and second, how essential it was, as a prerequisite for the extraordinary outburst of inventiveness and development that was so characteristic of the period, that the law of patents should have become embedded in the body of English law by the beginning of the 18th century.

Another recent example of revolutionary change, based on scientific innovation and affecting all of society, is that arising from the invention of the transistor in 1949.

The extraordinary developments in solid-state electronics and the associated computer and communications industries, are due in large measure, in my view, to the fact that in the U.S., a brilliant young engineer can make his fortune in solid-state design by the age of 30. There are today, in that industry, a number of young superstars, multimillionaires. We could call them the Dame Edna Everages of Silicon Valley. And for every successful superstar there are many more young engineers who have recently graduated, who are burning with talent, and full of ambition to emulate and follow.

Basic Cause

In that environment, there is no end to the innovation and invention that will unfold. The basic cause behind it all is the firm adherence to the rights of intellectual property; rights over which there have been many disputes and much litigation, but the existence of which is not in doubt.

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All this has happened in such a short time. I'm told that the first lectures given at Melbourne University in transistor theory were given at the same time that I was a law undergraduate there, and that's not so many years ago.

The Licensing Executives Society has, as its main task, the development of an efficiently operating international market in intellectual property. It is worth recalling, then, that the development of property rights as a reward for intellectual effort was an essential forerunner of the Industrial Revolution.

In 1623 James I provided for the granting of Royal patents to inventors and authors. The same sort of debate that we in Australia have had over plant variety rights in recent years, took place in England during the 17th century over the development of patent rights. A key factor in that debate was the realization that it was ridiculous that Shakespeare had had no copyright on his plays. His earnings had come solely from ticket sales to the performances.

By the 18th century that debate had been resolved. It is interesting to note that in those days authors and publishers had copyright in perpetuity.

But while the social benefits of the patent system were then well recognized, the merchants and traders of 18th century Britain were faced with quite irrational political and social attitudes about importing and exporting. Their problems were similar to the problems we face today concerning the exporting and importing of intellectual property.

In the 18th century, until Adam Smith converted the British Government, the conventional wisdom, reflected in official policy, was that the proper purpose of exports, (which were a good thing), was to build up the nation's gold reserves. A wealthy country was a country that had large and increasing gold reserves. It followed that imports, which diminished the nation's gold hoardings, were a bad thing and ought to be strongly discouraged.

Adam Smith pointed out that the whole purpose of exporting is to be able to import. However, to this day there is a sort of social consensus that exporting is a good thing, but importing is a bad thing. So we have export incentives, export awards, export councils, and so on, but no import incentives, import awards or import councils. The reality is that those who import goods or services from overseas are just as meritorious in their work as those who export and generate the overseas credits that pay for those imports. Importers and exporters need each other in equal measure.

However, this distrust of imports, when, taken to extremes, can still be found in some people in industries such as . . . well, I'd better not name them, who argue, at least by implication, that Australia ought to be completely self-sufficient in everything, that we ought to live unto ourselves, and that such a policy would guarantee employment for everyone.

This economic philosophy can be called Robinson Crusoe economics.

In anticipatory defense against mercantilist arrows, let me distinguish, very strongly, between protection of inefficient industries and the justifiable need to respond to dumped and subsidised imports.

I mention these things in order to lead up to a major point. In my view, there is no doubt that international trade in intellectual property is regarded with suspicion and even disdain by a wide section of the public and the political community. That Australians should pay money for information about technological processes from overseas, particularly from the Americans or the Japanese, seems to cast a terrible slur on our national pride. When it is the other way round, of course, then there is no doubt that we all feel a warm glow inside. Exporting technology is like winning at cricket.

It is worth noting, in passing, that national pride can be a very expensive thing, if it is channelled into uneconomic paths. The British-French Concorde is an excellent example, of such mis-channelling. It becomes clear, from reading the Rt. Hon. Joel Barnett's book "Inside the Treasury," how crucial for continuation of the Concorde were the representations by the member for Bristol, The Rt. Hon. Anthony Wedgewood Benn. Bristol, as many of you will know, was where the Concorde manufacturing industries were concentrated.

There is therefore, I suggest, a *continuing* need for societies such as the Licensing Executives Society, and its members, to remind politicians, journalists, clergy, academics, even economists, that trade is something that is mutually beneficial; that just as the purpose of production is consumption, so the purpose of exporting is importing.

In particular, we have to remind each other that while national pride is an important and proper thing, it doesn't feed or clothe the children, nor does it pay for their schooling. If an Australian firm can negotiate a licensing agreement which opens a profitable area of business, then such an arrangement is indeed in the national interest. It creates wealth, employment, and it generates tax revenue. Nothing could be more perverse than to condemn such an arrangement on the grounds that the new technology is foreign-owned.

Mercantilism

Adam Smith wrote, ultimately with great success, against the conventional wisdom of his day, mercantilism. It is not unfair to call hostility to the importing of overseas developed technology "intellectual mercantilism."

Our two major export industries are farming and mining and metals processing. These two industries have major technological developments to boast of, and yet all too often journalists and commentators disparage the people in those industries as pick-and-shovel men, or even rural idiots. Marx, who I don't believe had any direct experience of agriculture, set a fashion with his reference to the "idiocy of rural life." Even if those labels were accurate, the important point is that these industries enable Australians to import most of the things we want to import. However, there is cause for cautious concern with the current preoccupation of government and opposition parties in Canberra with government support for local high-technology industries, the so-called "sunrise industries."

We must ensure that this very commendable enthusiasm does not, however, send us down the Concorde trail and impoverish us all.

Our new government, in particular our new Minister for Science, Mr. Barry Jones, has emphasized in recent times, the need for keeping up with the rest of the world technologically. This advocacy has been of great value in helping to stem the tide of technological Ludditism, which was threatening to overwhelm the trade-union movement a few years ago. However, it does carry with it the risk that the government will feel obliged to set up "Concorde" industries in all sorts of new technological ventures, most of which are bound to fail. Or the government may discourage or put difficulties in the way of those in the private sector who see opportunities in unfashionable areas of the marketplace, and wish to exploit them.

There is nothing wrong, by the way, about new ventures that fail. Most new ventures do fail. The great advantage of the market system is that those who risk their capital in backing new ventures have a very strong motive to do their best to ensure success in the venture. If failure looms, however, the same motive will operate to minimize losses and abort the venture.

However, when politicians' reputations and taxpayers' funds are involved, it is institutionally difficult to admit that a mistake has been made, that money has been wasted, that national pride has been insulted. It is politically inevitable that impending failure should be followed by further subventions from consolidated revenue in order to forestall that failure. This was the story of Concorde.

Key to Talent

With unemployment at levels not seen for 45 years, levels that very recently were regarded as quite beyond the bounds of possibility, it is natural that our parliamentarians will seek to assist new industries as much as possible. However, the urge to "spend money on a good cause" will not, of itself, bring about new wealth-producing industries. The key to untapping that great reservoir of Australian inventive talent is to look at the system within which we operate.

We need to know what makes people tick. What drives people to achieve where others have failed. And having done this, to establish a framework that best fosters these ambitions and recognizes the sacrifices required.

In summary, my point is that all Australians should take an active interest in seeing in place a framework of government that enables the greatest wealth to be produced. Political parties should limit their arguments to how that wealth is divided after it has been created.

Historically, it is evident that most technological developments and scientific discoveries have taken place in the richest and most advanced countries. In Australian history, most of our great rural, agricultural and mineral processing inventions and developments occurred prior to World War I, when we were the richest country, in per-capita terms, in the world. Australia, in the 50 years prior to World War I, was rather like a bucket of worms, a wriggling, writhing, hyperactive scene. Most of this inventive activity was a response to the need to survive economically in a new environment. Most of our great inventions were ingenious responses to immediate and pressing needs.

But some scientific and technical work was of a different kind. In passing, I want to mention Henry Sutton, born in Ballarat in 1856, who in 1870 at 14 years of age, made a clock-work-driven ornithopter, which flew by flapping its wings, and an electric generator/motor which preceded the Gramme dynamo by some years. He invented a carbon filament lamp just 16 days after Edison invented the same thing in America, and a vacuum pump which he demonstrated before the Royal Society in 1881.

Alexander Graham Bell invented and patented the telephone in 1876. Henry Sutton was then 20 years old, and hearing of Bell's telephone, invented 20 different types of telephone. He did not believe in patents, but others did, and 16 of his 20 designs were patented by others.

He also devised a television system, with the laudable ambition of enabling the citizens of Ballarat to watch the Melbourne Cup live. Sutton called it the "Telephane" and demonstrated it in London. Baird used most of Sutton's principles in his 1920 TV developments.

I've mentioned Henry Sutton because it seems wrong that such an extraordinary Australian should be unknown and unrecognized. We are indebted to Dr. Clive Coogan, of CSIRO, who has carried out a great deal of detective work in piecing together Sutton's career.

Sutton also helps me to emphasize two points. First, he did all of this extraordinary work without government subvention of any kind. Second, his lack of interest in taking out patents probably hindered the application and development of many of his inventions. That was a great loss to the Australian community.

Sutton was an outstanding example of Australian intellectual brilliance and technical ingenuity. But he was not really atypical. Even a cursory reading of the history of Australia for that extraordinary period between the Gold Rushes and the First World War shows a society that was inventive, hard-working, risk-taking, and determined to keep up with the rest of the world. And, as I've said before, it was the richest society in the world.

Quiet Life

But after the First World War there seemed to have been a change. Australia seems to have opted for security, for a quiet life. Certainly, the rate of technological innovation dropped right away. Protection became the watchword of industrial development. Perhaps the enormous numbers of casualties that the Australian troops suffered in that war—much higher proportionally than the British—sapped our enthusiasm and vitality.

These general observations are based on historical experience but they relate closely to the mining and minerals exploration industry.

Minerals exploration is an outstanding example of a "knowledge" industry. Many millions are spent each year looking for an elusive prize—a prize of unknown size. Today it is made increasingly more difficult to assess because of the extent of community expectation to share that prize even if they have played little part in the discovery. Having regard to the costs of the mining industry's exploration and research effort the pressure to make each dollar of expenditure effective requires greater reliance on the skills of our geoscientists.

Astute, experienced, and intelligent people, who have spent their lives continuously working at the boundaries of knowledge in their disciplines are a modern-day requirement in substitution to just "grubstaking" fossickers as may have prevailed in the past. An exploration company that wants to stay ahead, has to employ the most able geoscientists. It has to develop and use the latest equipment. It has to build up a data base and a theoretical structure which can construct, interpret, and modify the data base. It has to carry out the field work which complements all the theorizing and hypothesizing.

Minerals exploration is a very demanding and expensive activity, but it is one at which Australians have become good. However, just as patent rights are crucial in fostering, encouraging and diffusing technical and scientific discovery and innovation, so does security of property rights with regard to exploration discoveries affect, in the most direct way, investment in scientific exploration activity.

Security of property rights in relation to a minerals discovery is exactly equivalent to security of patent rights in relation to a new process or a new invention.

The inventor or the scientist in his laboratory is in an identical position to the geoscientist out in the field.

The research and development expenditure of the mining industry, is in fact, its exploration expenditure, and the same motives and rewards have to apply to successful exploration that apply to successful research and development. Prior to discovery in all fields what subsequently has great value beforehand was useless and of nil value.

We can extend this analogy further. The life of a discovered ore body is limited, just as the life of a successful patent is limited. Just as life itself is a never-ending race, and just as there is no end to research and development in the world of technology, so there can be no end to exploration for a mining company.

Let us go back to the problems of motivation, of rewards, of success and failure.

Those geologists and other earth scientists, who spend long hours testing their theories, who shun the normal pleasures of life, because of their commitment, do so because they seek fame and fortune.

When Disraeli, a Jewish outsider in English society, first stood for Parliament in 1844, he said to his constituents: "*There is no doubt, gentlemen, that all men who offer themselves as candidates for public favor have motives of some sort. I candidly acknowledge* *that I have, and I will tell you what they are. I love fame; I love public reputation; I love to live in the eye of the country; and it is a glorious thing for a man who has had my difficulties to contend with.*"

Quite so. And so it is with our geologists. All hope to experience the exhilaration of new discovery, to "create" what was nothing before and to so challenge the frontiers of man's present knowledge. They also hope to see their names immortalized in the literature and text books as having played a key role in the discovery of the next major mining bonanza.

Secure Title

But this is only possible if the company which employs him, supports him, and backs his hunches. This it can do only if it is secure in the title to that discovery.

If society takes the view, as it has increasingly been disposed to do, that mineral discoveries happen of their own accord—that a new Broken Hill, a new Mt. Morgan, a new Mt. Isa, a new Roxby Downs will pop out of the ground every five years or so, automatically—and that there is no reason the person or the company responsible for the discovery should gain fame or fortune, and therefore society can distribute the revenues from the mine as it thinks best; then exploration activity will wither away, and there will be no new discoveries, and ultimately, no mining industry.

While this is common sense and obvious to anyone, like myself, who has spent his working life in the industry, it is very difficult to persuade outsiders that it is true. As in most questions in social science, there is no absolute proof of anything. For example, while there is no absolute proof that the U.S. Food and Drug Administration has through its policy of extremely strict and time-consuming certification procedures, harmed many people through denial of access to new and beneficial drugs, the evidence that has been assembled suggests very strongly that that is indeed the case.

Likewise, the controversy over plant variety rights, the creation of property rights in genetic development, has been development of trade in property rights concerned with intellectual or "knowledge" goods, I urge, indeed I plead, with you, to do all you can, to impress upon people in all walks of life that the fundamental bases of a dynamic, growing, successful economy, are first, security in private property, and second, the inviolability of contracts.

The task of administering these principles is very much in your hands as businessmen and practicing lawyers with a special interest in patent and licensing systems. But your role, if I might repeat myself, is not sufficiently discharged through administrative excellence alone.

Like most specialized groups, yours is one that is, increasingly, commented upon by a growing electorate. That comment will continue, be it informed or otherwise, and will influence every aspect of the law as it changes.

Your vigilance in protecting the basic rights to intellectual property is paramount in a free society. I hope that this conference, dealing with the Frontiers of Technology, recognizes those obligations.