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Innovators in survival mode

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WHILE the politicians are busy making noises about the need for Australia to develop a knowledge -based culture and place greater emphasis on R&D, the major institutions responsible for Australia's most important developments during the last century are barely surviving or rapidly commercialising.

The two that particularly come to mind are the CSIRO and Telstra's Research Laboratories (TRL).

But we also had the famous Commonwealth Serum Laboratories (CSL) before a Labor government sold it off, leaving the country with reduced ability to counter major epidemics.

A few years ago we also had a very important private telecommunications research and development company called QPSX in West Perth, which owned the packet Segmentation and Reassembly (SAR) patents used in what was then called Queued Packet and Synchronous eXchange techniques.

This approach to running telephone and data networks became the IEEE 802.6 standard for Metropolitan Area Networks (MAN), and it is closely aligned with ATM (Asynchronous Transfer Mode).

To give you an idea of the relative importance of the QPSX developments, the other IEEE 802.x protocols are Ethernet (802.3) and Wi-Fi (802.11b) – currently the world standards used in local area wired and unwired business networks.

The idea of using MANs has since faded in importance because modern multi-laser fibre networks and high -speed switching provide an even better approach with conventional branched networks.

But the need to break up and reassemble larger packets remains fundamental in new cell -switching systems.

Telstra bought control of QPSX in the early 1990s, and then lost interest because the idea of MANs was waning.

Yet, at the time, QPSX was clearly a world leader in the then new techniques of cell-switching, which became the basis of ATM – now used around the world in telephone networks.

The company's SAR techniques were needed to allow larger data packets to flow through the new, high -speed cell switches.

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If you understand packet switching, you'll have grasped most of the features of cell-switching and ATM.

Cells are essentially just small packets that have a circuit number in the header instead of a much longer address, and they don't carry error checking data either.

The key is that cells are always 53 bytes in length, and since they are small and identical in size, they can be handled in silicon within a digital signal processing chip.

They don't need to be stored on disk or held in a memory bank waiting their turn with the microprocessor, as packets do when passing through a router, and they aren't checked for errors with each router-to-router hop.

This means cells can be handled relatively easily at very high rates in mass-produced silicon chips.

And when time-slots are reserved by setting up circuits (as we now do with circuit-switching for voice), the cells pass through the switches without delay.

The best analogy I can think of is this: say the postal system had a thin vacuum tube network joining all local post offices.

It would only work if the envelopes were small and exactly the same size.

These envelopes would then be sucked through the vacuum -pipe network instantly without needing to be bundled, trucked to a sorting office, and then on-carried the next day to the remote post office for delivery.

But a SAR system would then be needed to control the way large packets were broken down into smaller envelopes and then reassembled at the far end into their original form.

By using this SAR approach with small cells, future telephone networks will have the multi-stream, multiplexing advantages of the internet, but with the immediacy needed to carry interactive voice and video.

ATM cell-switching is gradually underlaying most of the world's new telephone networks, and it will eventually lead to the internet and telephone services merging – changing the way we use networks.

This probably won't happen for about 10 years, because the present dualistic system is adequate for our needs.

Also, privatisation, competition and duplication of national networks has dramatically escalated the costs of installation, maintenance and marketing for the carriers, while discounting the available income needed for upgrades.

In 1993, Telstra was first facing privatisation and competition, so nothing much was done with QPSX, and the patents weren't seen to be important.

The QPSX staff took redundancy payments and left, and eventually Telstra quietly sold off the company.

It was one of Labor's mid-term privatisations.

Kerry Packer and a number of Melbourne businessmen came to

own the company, and they've now had enough sense to enforce their patent rights.

Within the remaining years the patents have to run, ATM is expected to have global sales of \$100 billion, and so, last April, the company launched a campaign to enforce patent rights in Europe by filing a \$115 million writ against Siemens and Deutsche Telekom.

Soon it will file against US companies for an estimated \$1 billion.

So, while politicians from both side bemoan the lack of vision in Australian business, and beat their breasts over the lack of commercial investment in R&D, some of the worst examples of technological waste have come from Canberra stuff -ups, caused by political chicanery over asset sales and attempts to out -Thatcher the opposition.

In the case of the TRL, there has been a general downgrading of the type of R&D that could give Australia some role in telecommunications leadership.

We now have a dominant telephone carrier that buys almost no electronic hardware or software from its own country, yet at one time we were a producer.

The TRL is now down to a staff of 290, about half its peak level in 1995, and in the past few weeks it has been warned to expect another 15 per cent cut.

These figures don't reveal the true nature of the problems, because the cutbacks first destroyed the fundamental research and the work with international standards bodies.

This always happens when a large company downsizes.

It first loses the staff with experience and knowledge because these people can get good jobs elsewhere, perhaps overseas.

The tendency is to retain those whose jobs involve fixing immediate problems, and those creating specifications for outsourcing contracts.

Ziggy Switkowski recently made a meet -the-staff speech at Telstra's Clayton (Victoria) lab, and apparently the gist of his presentation was that he lies awake at night worrying about the downward trend in Telstra's share price, and since they are shareholders he expects the TRL staff to do likewise.

But most TRL staff are more worried about keeping a job than they are about a few dollars in dividends.

Ziggy's message was clear: the rump of TRL is in survival mode, and until annual profit growth returns to double digits, staff reductions will continue.

Staff numbers are only part of the problem.

There's also a progressive dumbing down of the company, caused by moves away from technological independence towards almost total reliance on turnkey installations.

This has been a major problem with the CDMA country cellular network.

Nortel was contracted to supply and equip the base stations and, when it finished these it handed the keys to Telstra and left.

Telstra then didn't have the staff knowledge or experience to align the transmitters, tweak the electronics for best results and generally make the system work above a basic level.

That's why it has taken a couple of years to get CDMA service standards up to a remotely satisfactory level.

Yet TRL was one of the first labs in the world to seriously examine CDMA back in the early 1990s.

TRL's job is to help draft the contract specifications for turnkey purchases, which often include guarantees hardly worth the paper they are written on.

Most technical expertise now resides with the vendor, so problems found after installation are supposed to be the vendor's responsibility.

Unfortunately, almost all vendors are offshore corporations with only sales staff permanently in Australia.

Most of them are also having serious financial problems of their own at home, so they see Australia as just an annoying flea on their rump.

With their own trouble-shooting technologist in the head office in Europe, Japan or North America, most vendors have had no experience with Australia's unique conditions anyway, so often they are forced to hire some of the redundant TRL staff as consultants to address their local problems.

I guess that goes into the national economic records as the government creating new jobs.

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