



THE WARREN CENTRE
INNOVATION
LECTURE

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DELIVERED BY MR PAUL SALTERI
GROUP MANAGING DIRECTOR, TENIX PTY LIMITED

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Our support of the Warren Centre allows us to demonstrate our commitment in a practical way. We are delighted to continue our support for the Innovation Lecture.

Dibbs Barker Gosling is a national law firm with offices in Sydney, Melbourne, Brisbane, Canberra and Perth. The firm has been in operation for more than 100 years.

The *InnovationXchange Network* is Australia's first knowledge exchange network, providing fast-track connections through its trusted intermediaries to the resources needed for business growth. www.ixc.com.au Grant Kearney, Chief Executive Officer 61 2 9466 5548, gkearney@ixc.com.au

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AUSTRALIAN INDUSTRY
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prologue

The tenth Innovation Lecture is an innovation itself.

This year Mr Paul Salteri, Group Managing Director of Tenix, tells us how he and his team have transformed Australia's largest naval defence contractor into an innovative technology organisation – he tells us how he taught an elephant to dance.

Which leads me to use the occasion of the 10th Innovation Lecture to celebrate another great innovation – The Warren Centre for Advanced Engineering itself.

It is appropriate for us to do so at the time when our chairman and one of the founders of The Warren Centre, Peter North, has been awarded an Order of Australia (AM) for his dedicated leadership of the Centre over 22 years, and he is still brimming with ideas to make us stronger.

To commemorate the 100th anniversary of Professor William Warren's first lectures in Engineering at the University of Sydney, the Founding Committee in 1983 decided to raise money to create a forward looking institute concentrating on excellence and strong involvement and close liaison with industry.

The Warren Centre is unique in Australia because of the dedication and power of its volunteers – a substantial group of industry leaders who are prepared to roll up their sleeves and work together to solve some of Australia's greatest challenges using technology, advanced engineering and innovation.

A quick look at the titles of some of the projects will illustrate my point that no threat to Australia's future security, prosperity and environment is too great or too small for us to tackle provided it is not being handled by someone else.

In 2005 The Warren Centre will spread its wings and embark on new initiatives Australia wide with stronger partnerships with Engineers Australia, The Australian Academy of Technological Sciences and Engineering, Australian Institute for Commercialisation and Melbourne Business School.

One example is the launch later this year of our "10,000 Friends of Greater Sydney" which, we hope, will spread to other cities in Australia.

This program will bring together a broad cross section of stakeholders to provide research based commentary and advice on the future of Greater Sydney as a place where its citizens can live, work, learn and play without having to struggle with long frustrating commutes, pollution and inadequate services. Its first emphasis is on transport building on the multi award winning "Sustainable Transport in Sustainable Cities" project.

Over the last 22 years, The Warren Centre has remained committed to its goal of harnessing the incredible power of an harmonious combination of Industry, Academia and Governments at all levels to solving Australia's challenges in areas related to technology.

Australia will continue to issue challenges. The Warren Centre for Advanced Engineering will continue to find solutions and will be a living tribute to its founders, the University of Sydney which spawned it and the great engineers who inspired it.

*Professor Michael Dureau
Executive Director
The Warren Centre for Advanced Engineering*

THE **Warren** CENTRE
FOR ADVANCED ENGINEERING



Mr Paul Salteri is Group Managing Director of the major Australian industry/technology company, the Tenix Group, with headquarters in Sydney, Australia.

Tenix earns almost \$A1B annually and employs more than 3,500 people. Major skill areas include systems integration, industry development, armoured vehicles, ship repair and refit, software systems and commercial support programs.

Mr Salteri was born in Italy in 1947 and came to Australia with his father Mr Carlo Salteri - one of the founders of the original Transfield Group. He graduated from the University of NSW in 1971 with a Bachelor of Commerce degree, trained as an accountant, and joined the Transfield Group in 1978.

He is a past Director of Austrade, a member of the National Executive of the Australian Industry Group, and former Chairman of AIG's Defence Manufacturers Council. He is also a Fellow of the Australian Society of Certified Practising Accountants, a Governor of the Warren Centre for advanced engineering at the University of Sydney and a member of the Defence Industry Advisory Council.

In 1999, the Italian Government awarded him the title Cavaliere Ufficiale.



Mr Paul Salteri

Ladies and gentlemen,

On behalf of Tenix I would like to welcome you all to my presentation today, and I am delighted that so many of you have taken up the invitation to hear my address entitled “Where’s Waldo?... Tenix’s global search for innovative solutions.”

In our time together today, I intend to give you an insight into:

- how Tenix is using innovative technologies;
- our partnering arrangements; and
- commercialisation initiatives we are undertaking to build and transform the Group.

In doing so I hope to reveal:

- Tenix’s “relationship” with innovation;
- the value we place on it; and
- and how it’s reflected throughout our corporate culture.

According to a recent survey in the United States by CNN, the top 10 innovations of the past 25 years are, in order, as follows:

1. The Internet
2. Cell phone
3. Personal computers
4. Fibre optics
5. E-mail
6. Commercialised GPS
7. Portable computers
8. Memory storage discs
9. Consumer level digital camera
10. Radio frequency ID tags

In creating the list, CNN hoped to single out, and I quote, “25 non-medically related technological innovations that have become widely used since 1980, are readily recognizable by most Americans, have had a direct and perceptible impact on our everyday lives, and/or could dramatically affect our lives in the future.”

So, we can assume that this is one plausible definition of ‘innovations’....There are many others.

So many, in fact, that I suspect that ‘innovation’ still remains ill-defined, even today, and is more or less identified by the nuances of the particular activity or sector to which it is linked.

So, what is innovation? Or perhaps, more correctly, what is it NOT.

- Innovation is not easy: it’s hard work.
- Innovation is not luck: it’s persistence and tenacity.
- Innovation does not happen by itself: it needs planning and commitment.
- Innovation is not serendipity – but sometimes can look like it.
- Innovation is not discovery: innovation doesn’t have to be new in the R&D sense.
- Innovation is not growth by acquisition: innovation is growing by reinventing oneself.
- Innovation is not commercialisation – but it can be used to commercialise.
- Innovation is diversification – but based on what you know.
- Innovation is putting things together: using something differently.
- Innovation is making people free to think laterally.
- Innovation is building a team that is different from you, and hiring people who are better and smarter than you.

In a knowledge world, innovation is providing solutions, solving problems, getting results.

- Innovation could be as simple as picking the right partner - a partner who has the correct positioning in the marketplace to introduce and get traction with a new product.
- Innovation is letting go. Letting the diverse talents in an organisation grow and express themselves; conversely it is reigning in at the appropriate time if things are not going in the right direction....not succeeding.

To clarify these thoughts in what I describe as, “Tenix Terms”, innovation has a slightly different perspective. For us:

- **Creativity is coming up with ideas;**
Where as, Innovation is bringing ideas to life.
- **Invention is the creation of a new concept;**
Where as, Innovation is converting that concept to practice, and making it a commercial success.
- **Science uses money to create knowledge;**
Where as, Innovation uses knowledge to create wealth.

Quite simply, within Tenix, innovation is not a concept — it’s a practice and a process!

It is fundamental to our Corporate Governance-styled approach to corporate management, and identified as one of our 6 corporate values, which include Safety and the Environment; Integrity; Teamwork; Leadership; and Tenacity.

When listing our values, we link innovation with improvement – and are candid in its description that: *“We are relentless in our pursuit of innovation and improvement in all that we do”*.

It underpins our Corporate Passion, which is stated as: *“We are driven by the challenge of applying technology to deliver innovative solutions that our customers value highly”*.

We also have as our corporate “motto”, or “value proposition”, that Tenix is committed to providing “innovative solutions”.

This is aptly demonstrated by our business ‘split’ from Transfield some 8 years ago in 1997, when Tenix Pty Limited was formed. Since then, Tenix has gone on to establish its credentials as so much more than “the shipbuilder” that it was originally known as.

This transformation – from a singularly-focused business into a multi-dimensional, multi-national provider of a range of services and products – was underpinned on innovation; that is, innovation led by customer demand and our unwillingness:

- to compromise; OR
- to accept or tolerate poor practices that were endemic, at that time, in the major Australian infrastructure projects.

This transformation is arguably our biggest innovation of all!

Our philosophy was, and continues to be, to genuinely strive to give our clients what they want – and not simply to abide by the black letter of a contract.

So I can say, with humility, in all respects, that “innovation” is integral to:

- our approach to business;
- our organisational goals;
- our passion;
- our culture;

....and is viewed as our fundamental means of differentiation from our competitors.

The truth is our products and services compete with other products and services; and this competition takes place in a variety of ways – starting with the innovation and value delivered in the product, running right through to training of our partners, and in most cases through life-support.

When Tenix thinks about innovation, we think about innovation in a “value sense” for our customers and a competitive market.

Without question, we fully intend to continue to show our existing and future customers, and the marketplace in general, that we have the ability to systematically exploit our potential in this regard.

However there is a gap between understanding innovation, and actually identifying it and turning it into a business proposition.

To use an analogy for this, “Where’s Waldo”, that well known children’s game, shows just how difficult it is to spot a particular face in a sea of different faces. This game aptly parallels the difficulty in spotting a winning idea or technology in a sea of such opportunities.

Yet it is that other Waldo – US essayist and poet, Ralph Waldo Emerson, author of *“The Conduct of Life”*, and *“Letters and Social Aims”* – whose words have become immortal:

“If a man can write a better book, preach a better sermon, or make a better mousetrap than his neighbour...then though he built his house in the woods, the world will make a beaten path to his door”.

Well at the risk of sounding somewhat controversial, when Ralph Waldo Emerson wrote this, business life must have been a lot simpler and more predictable.

Back in the mid-1800s, Ralph Waldo hadn't heard of market awareness; cost pressures; distribution channels; inter-system compatibility; accreditation; certification; and export controls; let alone the Buy America Act and other international 'home grown' preferences.

Today, radical new ideas are often rejected when they first emerge.

And then there is the challenge of the customer:

- who may not perceive the worth of your product;
- who may not need your product (or may think that he does not need your product);
- who might not like the "look" of your product (even if it is "better"); or
- it may be just too plain hard for them to get your product.

Research by Professor Bob Cooper - of McMaster University in Canada - has shown that only 1 in 60 new product ideas are successful commercially.

Sorry Ralph Waldo, but in reality, the "path to your door" may not be that easy to find!

So what are the keys to success?

- Why do some companies succeed in the difficult art of commercialisation?
- Why do some companies succeed offshore?
- Why indeed do some companies, having invented (or bought) a better mousetrap, succeed in building a superhighway to their door?

We at Tenix are still learning the answers to these questions, but it is useful to look at how we are approaching it, what we have done, and what lessons we have learned.

In a knowledge world, innovation is understood and identified as falling within one of two distinct categories namely, "hard innovation" or "soft innovation".

Hard innovation is organised Research and Development characterised by strategic investment in innovation, be it high-risk-return radical innovation or low-risk-return incremental innovation.

Within Tenix this is best illustrated by our \$40 million Take-to-Market fund in operation until last year.

This reserve provided in-house support – and a mix of financial and human capital – for high-growth, high-return business opportunities, focused on establishing our capability to commercialise and market emerging technologies.

As a more specific example, we developed and patented an innovative light-weight cladding for retrofitting to Naval surface ships, and other large potential 'targets', to reduce their radar reflectivity.

Alternatively, **Soft innovation** is the clever, insightful and useful idea that any person in an organisation can think of.

Again using Tenix as an example, there are instances where we have:

- chosen the right partner in a joint venture – a partner who has the correct positioning in the marketplace to introduce and get traction with a new product;
- researched an innovative approach to managing communication risks; and
- developed an innovative approach to attract Australia's best university graduates into our Graduate Recruitment Program.

However, it's not only the few bright individuals that make Tenix innovative; nor the fact that we recognise and encourage the development of both Hard and Soft innovation – it's the connections and the supporting organisational structure that enables us to be innovative.

So, what are our goals, and how do we achieve them?

A key driver for Tenix is the aim to be Australia's best and most trusted provider of Defence material, and of innovative technology-based engineering and service solutions.

We also aspire to expand globally by taking Australian innovative solutions to the world marketplace.

We are now aggressively taking new ideas and new businesses to the global marketplace and continue to search and assess new opportunities and partnerships.

This is part of our rebalancing of Tenix, that I mentioned earlier, whereby we are moving away from being dominated by our purely defence-related interests.



Strategically, we have several options and plans in place to achieve this.

Within these, technology is, of necessity, a key component, whether we are building frigates, constructing surveillance arrays across the northern part of Australia, or providing security solutions across the globe.

To date we have had quite a number of successes in turning technology-based innovative concepts into successful commercial reality.

And this is where Datagate comes in

To use its correct title, Tenix Datagate – a subsidiary within the Tenix Group – was established to develop and market the Defence Science and Technology Organisation's range of technology products, known as Interactive Link.

Interactive Link offers world-first IT security solutions that enable data transfer between networks of differing security levels, while at the same time ensuring sensitive information is not exposed or compromised.

It permits organisations to maximise productivity by safeguarding the use of open networks such as the Internet, while still maintaining the security and integrity of the agency or classified network.

Since its development, over 6,000 Interactive Link devices are now used in government and defence organisations throughout the world. In Australia alone, Commonwealth personnel from Defence and government agencies currently use more than 4,000 Interactive Link devices in their daily activities.

The success of the Interactive Link product range led Tenix to launch the Veto range of products, the commercial variant of Interactive Link under license.

The Veto range provides commercial organisations with the same security protection for their information assets, but with a smaller and more aesthetically appealing design suitable for desktops.

Tenix Datagate security products are certified to the highest possible level, E6, under the European ITSEC standard. They are also the world's first and only products to be accepted for evaluation to Evaluation Assurance Level EAL7 in the USA under the "Common Criteria" international standard for IT security evaluation.

Once awarded an EAL7 rating, it will then be a security product that is unique in the world.

It has applicability not only to Defence secure environments and operations, homeland security, law enforcement, and coalition environments, but also to such commercial entities as stockbrokers, analysts, accounting firms, and other entities where security of information is prized.

Interactive Link won the prestigious IT security competition of the combined World Congress on IT 2002.

As a further example, we invented, patented and marketed a multi-award winning data aggregation and warehousing software, designed to rationalise and cross validate data.

This exciting initiative, entitled Crossbow, originated from the ANZAC Ship Project, which was a collaborative effort between the Australian and New Zealand Governments to develop and construct 10 ANZAC Class guided missile frigates.

During the project, Tenix was faced with the not inconsiderable challenge of resolving communications between some 15 disparate and unconnected legacy applications.

Hence Crossbow was born from the need for a common platform for communications.

Innovation at its best - and on the run!

Tenix's approach to innovation, within the organisation is, I believe, realistic and robust.

We reward and acknowledge end-result success and project completions – but we also value the process itself and engage in a 'Lessons Learned' session as a postactivity de-brief. This has proven to be a valuable method for teasing-out areas we do well, and identifying those where improvement is necessary.

Our hard-won lessons were put to good use in our recently announced Kimberley Canal Project which we believe to be the only long-term, cost-effective, comprehensive and environmentally-friendly solution to Perth's water crisis.

As you can no doubt tell, I am passionate about this innovative approach to dealing with the pressing water needs for Western Australia.



And although it is infrastructure based - in many ways this is a Soft Innovation in there are numerous precedents, and the technology was well proven, before Tenix transferred the concept and modified it to suit Australian conditions.

The essence of this innovation is that:

- Water would be collected from the Fitzroy River in the Kimberley, without the need for a dam;
- The water would then flow along a 3,700km long canal from the Fitzroy to Perth following the contours of the land along its route;
- The flow would be assisted by appropriately placed pumping stations; and
- Water would be delivered to Perth.

Apart from being a 'first' for Australia, it is my belief that the strategy, technology and infrastructure will be a sufficient catalyst to place water higher on our list of national priorities; and for other State governments or major private sector investors to see the potential of an integrated and complementary approach to water use and conservation.

Ideally the project also will provide a broader skill base and understanding for similar, large-scale activities.

In many cases innovation is limited by a mind-set that simply says that 'something is not possible' - this canal project translates a long-held vision, some 100 years old, into a viable reality.

Making the 'impossible' into the 'possible' is a process... and I would like to take a moment to look at:

- the infrastructure that supports innovation and the various steps along the way;
- see what is important and what is not; and
- consider Australia's ability to introduce its great ideas successfully to the world marketplace.

Upon reflection, there are three stages of innovation: **R&D (Invention) - The Institutions - The Market.**

All three stages play a part, all are important, and it is only when all three are in sync that we see really successful innovation.

At the R&D or invention stage, all too often do we get carried away with the bright idea.

It's important to remember that when you are being seduced by the excitement of it all, that it takes many years of hard and dedicated effort to be an overnight success!

We then come to the institutions. They are often untainted with a deep knowledge of either the technology (R&D) or the real nature of the dynamic market, especially in High Tech.

All too often they are focussed primarily on the money side of the ledger, without a real appreciation for the psyche of innovation - that is so vital if you are going to get it right.

Most, driven by further investment or research and development dollars, have a mindset that "*failure is not an option*" - it can't be an option!

So here we are, in Australia, blessed with an abundance of people with great ideas....and yet, I suspect, that our own institutions do not place us at the forefront of global innovation or even recognise us as international players in this field.

I am becoming more and more convinced that it is the institutions that let us down - '*have a go mate*' might be the hallmark of the individual Aussie battler, but collectively in our institutions we want a risk free existence.

Hence those institutions that we rely on so heavily, often cannot be the effective 'bridge' between the idea and its realisation....between the invention and the market.

We then turn to the market.

How often have you heard the phrase "*the market knows*"? In a large sense that is correct.

How often have products been launched, only to find that they bomb, even with an almost unlimited advertising budget?

How often have people rejected a new product for what would appear trivial or inconsequential reasons. Where does style and culture, play in all this?

Conversely, who would have guessed that the phenomenon of Ken and Barbie would have taken off, let alone be so successful for so long? Or the Walkman, which no one asked for, but which instantly, took off?

Notwithstanding, it's the market that ultimately determines success or failure.

Much has been written on the market, and hence I will not dissect its various attributes. But I will say that you need to make the time and the effort to “know your market”.

In this way, the likelihood of success becomes far higher than simply a random chance.

I suggest that the best strategy for learning about your market is to try-out something in a small way; test and retest; change and change again – until you get it right... (or before you run out of money).

Let us now turn to the structure of the high-tech world in which we live, the information age we find ourselves in, and see how to harness innovation in that ever changing vista.

Firstly, change is endemic. Our access to knowledge is increasing dramatically – look how “Google” has improved in efficiency over even this past year. However that means that the rate of discovery, invention, and innovation will also increase, a compounding effect that will continue until the limits are reached, and the curve flattens out to form that well known “S” shape.

But we are far from that stage yet, and we can confidently predict that Moore’s Law will be around for quite some time.

Moore’s Law states that computing power – and hence capability – doubles every eighteen months. It has been relentlessly true in the past, and gives no indication of faltering in the future.

But within that increasing rate of discovery we can discern several types of technological change: evolving or sustaining technology, emerging technology, and revolutionary or disruptive technology.

Like most things in life, technology too is full spectrum in its character and its potential to affect our day to day lives.

Innovation can therefore be found throughout that spectrum.

I suspect that evolving or sustaining technologies are, and will remain, the lifeblood of successful companies for the foreseeable future.

It will most likely be:

- the “quick new way” of doing something old,
- solving a problem,
- integrating several quite mundane technologies,
- or improving logistics,

....that will have a real payoff for most companies.

Any company that provides innovative solutions to its clients, and continues to do so, will have a robust and sustainable future in this most changeable of worlds.

However, the risks are there.

To my way of thinking, there are two distinct approaches of bringing innovation to the market; one for sustaining technologies and one for disruptive technologies.

For sustaining technologies, you need to be customer focused and continue to offer improvements and added capability as the customer grows and changes.

Tenix’s Hydrographic Management System is an example of this. We have introduced it to the Royal Australian Navy, and we are currently discussing it with both the Royal Navy and the U.S. Navy.

Conversely, for disruptive technologies, the challenge is to invent or find a new market and be prepared for the inevitable costs in time and effort to grow that market.

This often requires partnering with new and different organisations, ones that “know” the new market and are trusted in it. This is difficult for established companies, as the culture and values of the new partner are often quite different.

It takes real tenacity to make such a “marriage” work.

Indeed, for the introduction of new disruptive technologies it often requires many false starts as a business ‘feels its way’ in this new environment.

The real trick is to take one step at a time, learn by doing as available information on the new market is sparse at best, recognise mistakes before they cost a fortune, and be prepared to try new approaches, or indeed new partners, in order to achieve success.

We do have disruptive technologies that come along from time to time, and the challenge is to take the time and make the effort to keep tabs on all the emerging technologies so as to at least be forewarned of the likelihood of the emergence of a possible disruptive technology.

For such disruptive or revolutionary technologies can often be seen to be coming.



Some of my people now walk around with a tablet computer that:

- recognises both handwriting and voice,
- can translate both to the written word (thus making it instantly searchable),
- can make telephone calls from it worldwide at zero cost using the Internet,
- deliver emails instantly,
- has broadband connectivity that is “always on” even in moving vehicles like trains, buses and cars,

...yet remaining completely “unwired” from their desks. And it can do all this from anywhere in the world!

This has huge implications as to how we do business, where we do business, the internal structure of the corporation, and the external housing of the corporation, let alone the cost of infrastructure to support that business.

And it is those infrastructure costs that can be crippling.

So how do we harness innovation? How do we imbue a culture of innovation? I believe that this is the question to be asked by CEOs and Boards today.

The best way to innovate in any business, is to innovate your way ahead of the competition.

You need to create ‘temporary monopolies’ for your products and services – you, quite simply, need to make yourself indispensable.

Innovation is driven by culture, and the ability to implement. This can be achieved by harnessing the creative power of your greatest asset – your people.

The goal is to turn them into opportunistic entrepreneurs who are constantly looking for new ways of doing business.

And although I firmly believe that innovation is not directly linked with age, I do believe the young people, these days, are inherently innovative.

Our education systems, lifestyle, access to technology and an unlimited amount of knowledge, personal freedom, as well as freedom of choice has resulted in our youth being encouraged to innovate and question and break traditional boundaries.

Young people are not experienced enough to know that something can't be done – so it is imperative to encourage them to come forward with new ideas; new ways of solving old problems; the use of new enabling technologies

to add to a sustaining technology; or indeed to invent a disruptive technology.

Within Tenix we recognise that our young people have been brought up in a communications revolution.

It is incumbent upon us to provide the tools and the encouragement to them to communicate beyond the confines of their immediate business unit; to experience the different types of work in different business units; and to be flexible enough to allow teaming arrangements within the company for specific projects and programs.

We also need to provide young people with experienced mentors and that have the ability to network within the company.

Indeed it is this “cross pollination” that often provides the seeds for new ideas, new approaches, and new innovative solutions to a customer's problem.

This in turn leads to growth of the company, hence validating this more flexible approach to management, corporate structure, and indeed corporate strategy.

We at Tenix introduced a young graduates program some four years ago to try to capture some of these aspects.

I am happy to say that it has been an outstanding success.

We have about 1,500 applications each year, we select eight (8), and over the last four years, since the program was instigated, we have lost just one (1).

Without doubt, these young people are an important part of the future of the company.

So having briefly discussed the culture of innovation let me turn to those other important aspects, **strategy** and **timing**.

The “better mousetrap” concept often misses the dimension of time – products that the market has no use for today, may indeed be the “killer app” of tomorrow.

This means that it takes tenacity, both in effort and cost, to hang in there until those market forces become aligned with the new product.

However it is often the best strategy, especially for disruptive technologies, to find a much smaller market that has a different makeup – a group that has a specific problem for which this new disruptive technology is the only available solution.

This gets the product moving and allows time for people to become acquainted with it, and to learn of its capabilities.

In this way other inventive people will find new and different ways to use the product and, quite often, point the way to a use that indeed becomes, in time, a large market.

Who would have predicted the overwhelming use of SMS messages just a few years ago for example?

Finally, the leader of a large corporation who wishes to cultivate innovation, in both sustaining and disruptive technologies must be ever on his guard to ensure that his corporation itself does not become one of the biggest barriers to innovative thought and action.

All too often the cries of “we’ve never done it that way before”, “why should we change a true and tried formula?”, or “that won’t work” are the very stuff that snuffs out inspiration, snuffs out motivation, and finally snuffs out innovation.

For at the end of the day it is a fine balance between culture and freedom, between security and flexibility, and indeed between policy and inventiveness – such are the challenges to innovation.

As Group Managing Director of a company whose history stretches back to the 1950s, I believe it is my duty to not just prepare the company for tomorrow, but to pave the way for the day after tomorrow, as well.

After all, my aim must be to secure Tenix’s long-term future – in the interests of both the company and its employees.

Looking into the future, Australia’s emerging and evolving national economy, and international market place, will be led by those who innovate, create, find and/or combine knowledge into new products, services, and distribution methods – faster than their competitors.

So, what do we need do to create the ‘Clever Country’ we claim we are?

- We need to move ‘innovation’ outside the traditional cells of science and technology – and create Innovation Champions who are both role models and spokespersons, in all sectors including: business, the Arts, community and volunteering, education, transport, infrastructure and, needless to say, Government at all levels.

- We need to put innovation fairly and squarely on the Government agenda - ideally it should be part of our national goals and be factored into economic planning and long-term strategies.
- No longer can Government’s investment in innovation be only via Research and Development direct funding. The Government’s commitment should be far broader with innovation dollars being channelled into all levels of education and all manner of community initiatives.
- Governments need to think, and act, beyond the political term, and put in place long-term expansive plans for projects that have a life span of more than 3 or 4 years. It’s important to add in here, that leaders of “big business” in Australia also need to think beyond their next term of contract, or appointment on the Board.
- We need to shift business priorities away from cost reduction and market driven outputs, and look towards growth in wealth by innovation. Greater public/private partnerships may be the answer.
- We need to establish networks of skilled and experienced people and integrate, collaborate and share ideas and ideals. And we need to retain people with these skills within Australia. We need to overcome the prejudices of age in the workforce, and view skill and experience as being a highly-prized commodity in any business.
- We need to build investor confidence; reconfigure our investment programs and opportunities; reconsider our economic policies – and place our nation on the international radar as a dynamic, robust, talented and creative country.

In Australia, we also need a philosophical change....and, as a nation we need to:

- Create a culture hungry for innovation and change; a nation not concerned with “she’ll be right”; but one focused on “she’ll be better”.
- We need to look beyond the social divide between the ‘intellectual think tanks’ or ‘domain of the higher educated’, and that of the ‘average’ person; to realise that we are each capable of innovation, and that innovation is not the sole right or responsibility of the well schooled.
- We need to act as a true community – that is, we need to appreciate and respect our differences and harness our individual skills and talents.
- We need to develop a deep understanding of innovation, highly value it, and embrace the fundamental belief that innovation is good.

I believe in Australia – I believe we can do it – and furthermore I believe that we are well placed to achieve beyond our wildest dreams.

I am not an idealist in this regard. I am a rationalist.

Well before Federation in 1901, Australians had demonstrated how innovative they were. Thousands of years ago, our Indigenous people developed tools unique in world cultures, such as innovative fishing traps, boomerangs and woomeras. Their innovative culture also developed creative dance and music, a range of practical and visual arts, and specialised crafts.

Later when European settlers arrived, early innovations included the windmill; the stump-jump plough; the stripper harvester; mechanical sheers; ice making machines and lamingtons!

Throughout the last 200 years, Australia has continued to top the international innovations list with ground-breaking firsts. The following is just an indicative list of some of the more interesting:

- In 1906, Australia produced the world's first feature length film – entitled, "The Story of the Ned Kelly Gang".
- In 1915, a Melbourne pharmacist George Nicholas, produced a high-grade aspirin product, called "Aspro", that later took over the international market.
- In 1918, Anthrax Vaccine was discovered by John McGarvie Smith.
- In 1928, Sydney-based MacRae Knitting Mills manufactured a swimsuit from silk. As a result Speedo Swimwear was introduced to the world in 1957.
- In 1930, the Sydney GPO was the site for the first Letter Sorting Machine.
- In 1947, scientists at CSIRO conducted the first successful cloud seeding experiments, making rain fall near Bathurst in New South Wales.
- In 1950, the first ever radio lesson was broadcast using the transmitter at the Royal Australian Flying Doctor Base at Alice Springs – this is now known as the School of the Air.
- In 1953, the first prototype of a solar hot water heater was developed by the CSIRO in Victoria.
- In 1958, Dr David Warren in Melbourne, invented the first black-box flight memory recorder.
- In 1961, George Kossoff and David Robinson build the first ultrasound scanner in the Commonwealth Department of Health.

- In 1964, the Ansell company introduced the first disposable latex gloves for use in surgery.
- In 1976, a silicon-chip ignition system for small engines in lawnmowers and chainsaws was developed by the Notarus brothers in Sydney.
- In 1979, the cochlear implant, designed to help the hearing impaired and profoundly deaf, was invented by Professor Graeme Clark of the University of Melbourne.
- In 1984, the first frozen embryo baby was born in Melbourne using a technique developed by Dr Alan Trounsen. Today this technique is commonly called IVF.
- In 1988, CSIRO and Note Printing Australia developed the world's first polymer banknote made from tough flexible polypropylene plastics – commonly called Plastic bank notes.
- In 1998, Polartechnics Ltd, the Sydney Melanoma Unit and CSIRO developed the "SolarScan" device to scan the skin and quickly assess sunspots to determine if they are melanomas.
- In 2000, The Cooperative Research Centre for International Food Manufacture and Packaging Science, developed new biodegradable packaging materials based on starch.

The list simply goes on and on.

The fact is, that the innovation landscape in Australia is profoundly changing.

Looking around this room, I see a diverse group of talented people. You each represent enormous opportunity for us as a community.

In my view, our individual, and shared ability to create new innovations and harness their power will directly impact Australia's national prosperity, security and global influence.

All we need do is allow our people to implement with excellence.

If innovation and entrepreneurship shaped the 20th Century; they will define Australia in the 21st.

So, to conclude where we commenced, with more words from the great Ralph Waldo Emerson who challenges each of us to be innovators....

***"Insist on yourself; never imitate....
Every great man is unique."***

The Warren Centre for Advanced Engineering

The Warren Centre for Advanced Engineering is the leading Australian forum for advanced engineering issues, recognised for its inclusive, forward-looking approach and the wide impact of its many achievements.

The Centre is a self-funding, independent, not-for-profit institute operating within the Faculty of Engineering at the University of Sydney, controlled by representatives from industry.

It has three principal objectives:

- to stimulate the application and further development of new engineering technology.
- to encourage the integration of innovation and engineering technology into the development of Australia's public policy and wealth creation.
- to provide independent comment and advice to government and industry on these and related issues.

The Warren Centre:

- identifies and supports major projects that bring together people at the leading edge in selected fields of engineering technology to develop new technical insights and knowledge in those technologies and accelerate their application in Australian industry.
- holds industry forums for companies in specific industry segments to explore opportunities of common or joint interest that will accelerate the development and/or exploitation of technology.
- organises events such as seminars, lectures and conferences that explore contemporary technology issues and disseminates the results of the Centre's activities.
- produces electronic and printed material to promote discussion and build awareness of contemporary, advanced engineering issues.
- recognises people and projects that make a unique contribution to encouraging excellence and innovation in all fields of advanced engineering.

Since opening in 1983, the Centre has gained wide recognition for its unique approach and its achievements in diverse fields of engineering technology and industry development.

The Warren Centre Innovation Lecture is an activity of The Warren Centre's Events Committee, aiming to promote understanding of new technologies and innovation and to encourage their use among Australian businesses.

Disclaimer

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The Warren Centre
Engineering Link Building J13
Sydney University NSW 2006
Australia

Telephone: +(61 2) 9351 3752
Facsimile: +(61 2) 9351 2012
Internet Home Page: www.warren.usyd.edu.au
E-Mail: warrenc@eng.usyd.edu.au



