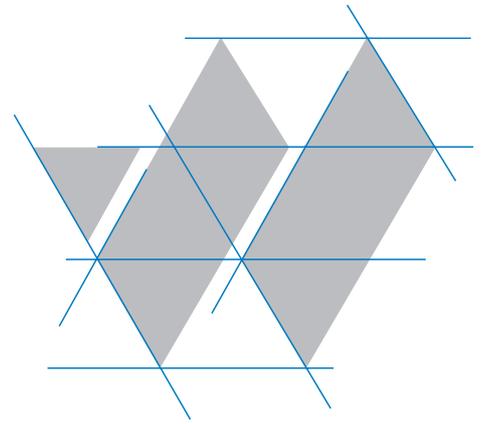


2000



THE WARREN CENTRE
INNOVATION
LECTURE

Proudly Sponsored by

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DELIVERED BY CATHERINE LIVINGSTONE
MANAGING DIRECTOR, COCHLEAR LIMITED



The Warren Centre wishes to thank AusIndustry, Macquarie Bank, PricewaterhouseCoopers and Ansett Australia for their generous support in presenting the 2000 Warren Centre Innovation Lecture at the Hotel Inter-Continental Sydney on Wednesday 5 April 2000.

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AusIndustry is assisted in its delivery to business by a series of independent, expert Boards. The Cooperative Research Centres, Pooled Development Fund, and Industry Research and Development (IR&D) Boards provide advice to the Federal Government and make decisions on funding support within individual programs.

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The Board's membership is drawn primarily from the private sector and its members' qualifications and experience cover a wide range of commercial and technical areas in various industries.

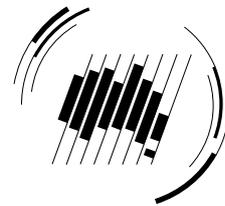
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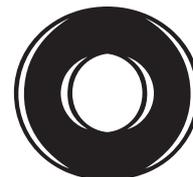
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prologue

Innovation has finally arrived in Australia - it is referred to by politicians, governments, educators and industry alike as the key factor embracing of which will raise and sustain the standard and quality of life of all Australians.

We all know that things are never so simple. Nevertheless, there is now a real and significant focusing of effort and attention to the creation of wealth for Australia through global, technology-based enterprise. The National Innovation Summit last February identified where improvements have been made and found many areas where incremental improvement could still be made in Australia's innovation system. The current challenge is to refine and develop the Summit outcomes into real, actionable and supported change.

In seeking a vision for these desired changes, Australian technology-based companies which have already achieved world credibility for their advanced, technology-based products and services form an important role model.

Cochlear epitomises many of the positive themes which emerged from the Summit. Building on a strong scientific and technological base, making effective use of intellectual property rights, establishing strong linkages between the research, education and industrial sectors, with a focus on continuous learning, and having a continual recognition of the central role of the customer are all exemplary.

The Warren Centre Innovation Lecture series continues to highlight role models and lessons critical to Australian companies aspiring to a global marketplace. The series is planned to be much more than the words of the lecture itself. It is planned as a stimulus to networking and common understanding between all elements of the Australian innovation system.

Australia has struggled for decades with the concept of changing from a rural based economy to one embracing high technology goods and services. From the Jackson Committee's investigation of manufacturing in the 1970s through the many thousands of pages of other reports since, the need and urgency has been espoused but to little effect.

But maybe there is hope that in the year 2000 we have turned the corner. The Working Groups leading up to the National Innovation Summit and the event itself have provided a starting point for a groundswell of concerted action.

For the first time, there has been a strong and unequivocal endorsement by an Australian Prime Minister for economic growth based on technology-based innovation.

The challenge now is on all those who read this booklet to appreciate the successes of the Innovation Lecturer, to share with others their own experiences and to contribute to the common goal of a technologically wealthy Australia.

*Professor Trevor Cole
Executive Director
The Warren Centre for Advanced Engineering*

Catherine Livingstone is an outstanding leader and manager.

Since becoming Managing Director of Cochlear Limited in 1994, Catherine has achieved successful public listing of the company – in 1995 – and its continued growth and profitability worldwide.

The business' market capitalisation has grown from A\$125 million at listing to \$1 billion in February 2000. The company holds 70% of the market worldwide, exports 90% of its products and devotes 11% of its income to its global R&D program.

The company, which pioneered the bionic ear implant, is renowned for its exceptionally inspired and committed management team – led by Catherine.

Prior to this role, Catherine was Chief Executive Finance for the Nucleus Group of companies – Telectronics, Cochlear and Ausonics – which boasted a combined revenue of over A\$300 million.



Catherine Livingstone

As well as running Cochlear, Catherine is currently on the Board of the Sydney Institute, the Australia-China Council, the Advisory Board of Macquarie University's Department of Accounting & Finance, and the Export Finance & Insurance Corporation Board.

In 1997-98, Catherine was a member of the NSW Innovation Council and, in 1999 won the prestigious Eisenhower Exchange Foundation Fellowship for Australia.

An inspiring public speaker, Catherine majored in accounting at Macquarie University.

When time permits, she enjoys competitive squash and gardening as well as spending time with her young family.

Introduction

Distinguished guests, ladies and gentlemen.

It is with some degree of hesitation that I stand here this evening to review with you the challenges of Managing the Innovative Global Enterprise. At Cochlear, we have learnt through trial and error, sometimes being cautious, sometimes being brave – and more worrying, sometimes not realising how brave we were being! But all the time, knowing that we had to continue to move forward, integrating new concepts and new ideas. Every organisation must find its own way, and having found that way, must immediately innovate beyond.

Unfortunately, the term innovation is at risk of losing meaning through overuse - in the context of our discussion this afternoon, I will interpret innovation as meaning the process whereby new ideas are transformed, through economic activity, into a sustainable value-creating outcome. There are two key words in this interpretation which are worthy of emphasis:

Process: innovation is *not* just the idea – innovation is only achieved when the idea has been transferred into an outcome which has value i.e. there is something which is perceived as having value to the extent that people are prepared to pay for it. We are facing an emerging, if not present risk, that the idea, the concept, is perceived to have a disproportionate role, and hence share of value, in the achievement of innovation. This view is being engendered by the rules of the so-called “new economy”, which is rewarding the idea, the potential, with blatant, if not flagrant disregard for the effort required in the transformation process. The “1% inspiration/99% perspiration” rule has never been more relevant than it is today.

A consequence of this is that those who generate the ideas may believe there is an immediate entitlement to economic returns in the form of royalties and/or IPO profit, and at a level which not only fails to recognise the inherent risk in the transformation process, but which also compromises the rate of return on the project overall. This problem is exacerbated by the layering of royalties which can occur when a project involves integration of several ideas or technologies, each of which is accompanied by a demand for super returns. The end result can be a blocking effect, where the ideas do not flow from the generators to the transformers.

The second key word is “sustainable”: I will take the liberty of interpreting innovation as requiring a repeat effect and/or longer duration, rather than a one-off, short duration impact. Sustainability requires good integration with those who assign value i.e. the customers, the market, and it implies rigour and continuous measurement. We are talking about a marathon, not a sprint.

Having exercised a degree of editorial prerogative with regard to the interpretation of innovation, I would like first to provide some background on Cochlear, and then to explore the theme of Managing the Innovative Global Enterprise, through the four dimensions of Organisation, Technology, Strategy and People.

... innovation as meaning the process whereby new ideas are transformed, through economic activity, into a sustainable value-creating outcome.

History of Cochlear

Cochlear came into being at the beginning of the 1980s, as a result of a partnership between the University of Melbourne/Graeme Clark (the source of the idea), the Commonwealth Government (facilitation funding provider via a public interest grant), and Nucleus Limited/ Paul Trainor (the transformer). At this point, I would like to pause and acknowledge the contribution of Paul Trainor. Paul is one of Australia's true entrepreneurs – and without him, Cochlear would not exist. Paul had a vision for a medical technology industry in Australia and established Nucleus as the vehicle through which he could realise this vision. He understood very well the hazards of the transformation process, but in taking on the commitment to commercialise the cochlear implant concept developed by Melbourne University, he managed that risk by anchoring his investment in a thorough understanding of the market and its potential. Paul was committed to sustainability.

By the mid 1980s, Cochlear had established itself as the global cochlear implant technology leader, and by the early 1990s, most of the early entrants in the industry had withdrawn. By the mid 1990s, however, new competitors emerged as serious players, and at the same time, one of the early entrants evolved its technology to a level very competitive with Cochlear's.

Today, Cochlear has more than 500 employees, based in nine offices worldwide. Cochlear's *Nucleus system* is sold in over 50 countries, and we have approximately 65 – 70% worldwide market share. Currently, we spend in the order of 13% of revenue on R&D, with the "D" based in Australia, but with the "R" sourced globally, including from Australia.

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to sustainability.*

Organisation

There are some key milestones in Cochlear's development.

These milestones highlight one of the most important dimensions of innovation in Cochlear, but one of the most challenging. That is, you will note that very early on, Cochlear established operations outside of Australia i.e. it had *international* operations. This is very different from being a *global* company, and highlights one of the greatest challenges in Managing the Innovative Global Enterprise – that is, the challenge of being global, as distinct from international.

While having operations in a number of countries i.e. being international, does expand the surface area of the business which is exposed to the influence of the marketplace, it is only by being global that the benefit of that expanded interface can be harnessed. This distinction can be described as follows: *international* refers to the degree of geographical spread, whereas *global* refers to the degree of integration. Cochlear was initially international, but, by the mid 1990s, recognised that ongoing innovation would require globalisation i.e. integration, and integration with the purpose of leveraging scale to learn quickly and deliver effective and efficient global responses to the market, where those responses could be of a product and/or service nature.

To achieve this transition, Cochlear has undertaken a number of programmes:

- Probably the most important of these was, and continues to be, a Values Integration programme. A great deal is said of Values, much of it tokenism, but Cochlear has truly embraced a Values framework: Values refer to preferences and priorities, not to right and wrong. The significance of Values in a global organisation is the alignment of personal and business priorities, and in a way which enables individuals to achieve their personal definition of balance. Further, it defines a standard of behaviour which all individuals are entitled to expect of others, and an objective language through which to deal with those situations when that standard is not met. Our Values are quite straight-forward, but are deceptively powerful.

... one of the greatest challenges in Managing the Innovative Global Enterprise is, the challenge of being global, as distinct from international.

... ongoing innovation requires globalisation ie. integration to leverage scale and deliver effective and efficient global responses including products and/or services.

Corporate Values

- **Mutual respect:**
promote open communication and global integration
- **Professionalism:**
demonstrate integrity and altruism
- **Continuous improvement:**
*ensure quality and reliability;
encourage change and innovation;
develop a learning organisation*
- **Performance:**
*encourage initiative and opportunity;
reward accountability and responsibility*

We embarked on the Values Integration path in 1997, and even in the current financial year, we have run a Values Champion Revision programme in the Americas Regions, two internal programmes, each with separate groups, in Manufacturing, and will be running a Values Champion programme for our European team at the end of the month.

- Once we had established the Values framework, we embarked on a project to agree on, and map, our core processes. Like most companies which have grown rapidly from small beginnings, Cochlear went almost overnight from a situation where everyone knew everyone else, and what everyone did, to a company with people full of the best intentions, but becoming very frustrated by the fact that they found it hard to get their job done, because everyone else kept getting in the way! This problem was cast into stark relief by the findings from a 1996 Employee Climate Survey where everyone felt they were helping everyone else, but no one was helping them.

In the event, we identified eight core processes, five primary and three supporting.

Several benefits have flowed from this activity:

- The rigour of end-to-end process definition, albeit at a high level, enabled identification of key gaps which were causing leakage in Cochlear's innovation system, including cross-border gaps.
- The flexibility possible within the process definition has provided a counter-balancing influence to the rigidity of the many prescriptive procedures necessarily required by our Quality System Framework.
- The importance of outputs as distinct from inputs is constantly reinforced, and we are phasing in role definitions, which define areas of accountability and responsibility, rather than being job descriptions, which, at best, identify a list of tasks. The distinction between these two approaches has important consequences for innovation: when a person is focussed on their accountabilities (deliverables) but given the freedom, within the process and Values framework, as to how those accountabilities should be achieved, that freedom fosters innovative behaviour.
- By defining Roles in terms of required process outcomes, we have moved from the constraints of an hierarchical organisation structure. I think it is fair to say that one dimensional hierarchical structures, where employees have a single source of direction, are proving less than robust as a framework for dealing with the demands of innovation, and the increasingly global nature of business. Cochlear has moved more to team-based relationships, and networked and matrix structures, with individuals having to deal constantly with competing priorities. Having roles focussed on the outcomes required, rather than who a person is and to whom they report, helps resolve much of the ambiguity inherent in multi-dimensional structures.
- Finally, a clear process framework helps to manage the adverse consequences of scale. That is, processes provide a mechanism for embracing expanding complexity and changing market conditions, thereby avoiding the danger of organisational drag as the number of employees increases. This drag effect saps energy from the innovation system.

Cochlear today is a global company, but there is no doubt that it has taken over five years of concerted effort, by many people, to achieve this. Nevertheless, the benefits are profound. A graphic example is our recent acquisition of the technology of a competitor which had chosen to exit from the cochlear implant field. Associated with that technology was a team of 30 highly skilled cochlear implant researchers based in Antwerp, Belgium. While acknowledging the potential challenges involved in having an R&D team remote from the main team in Australia, nonetheless, there was confidence that our global framework would facilitate integration. In the event, it is now less than two months since the acquisition was finalised, and yet the two teams are already integrated and delivering an enhanced level of innovative thinking.

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Technology

Moving now from the organisational framework to the technology framework. The Rand Corporation, in its 1998 report *New Forces: Critical Technologies at Work*, made a very useful distinction between technology makers, technology integrators and technology takers: I say useful, because a company's own innovation system is likely to be more effective if it explicitly recognises the way in which it wishes to participate in the global innovation system. Cochlear sees itself predominantly as a technology integrator i.e. though we do generate aspects of our own technology, we have a core skill of being able to collaborate with cochlear implant researchers around the world, and to maintain our awareness of emerging technologies in areas outside of cochlear implants, and then integrate those outcomes into our product system. The rate of change of technology is too rapid for a business the size of Cochlear to be a technology maker – nor, I believe, would this lead to an optimal outcome, even if time allowed.

This then leads to the issue of managing and protecting intellectual property. I have already referred to the emerging concerns with regard to the flow of intellectual property from universities and researchers. New “return models” are, however, being developed, which may provide a return to researchers which is perceived to be equitable and yet not act as a disincentive to those involved in the transformation process. The capped decaying royalty approach is an example of this, and is particularly suitable where new technologies are continuously being integrated around a more slowly moving core.

The question of protecting intellectual property is becoming increasingly problematic: patent protection, while still vital, is hampered by the complexity of the technology and the diminishing ability of the judicial system to provide justice in a timely manner, especially in the USA. The cost of patents, and patent protection through litigation, is also becoming prohibitive. As I said, patent protection is still vital – a strong patent portfolio can, in the best case, act as a deterrent, (somewhat like a minefield), and still provides a fall back option as a negotiating position.

Increasingly, the most effective means of protecting intellectual property, particularly in a technology integrator framework, is to preserve it as know-how, (and here again, processes become a critical part of embedding know-how in the organisation), and then to focus on innovating faster than the competition. In Cochlear's case, this approach has a special challenge because, although we must innovate rapidly to remain the industry leader, we risk suffering an adverse reaction from our customers: the cochlear implant product is a lifetime decision for a recipient, and parents of a recently implanted child don't like to feel that they have missed out on a better option for their child; similarly, clinicians need to undergo retraining with each new technology release and this is a burden on their already stretched resources and time. One possible answer to managing this

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Nucleus 24 Contour Implant



dynamic is to move towards having a portfolio of technology options on the shelf which can be brought to market quite quickly when the market is ready. In Cochlear, this approach is, as yet, more of an aspiration rather than a reality! In fact, the opposite is almost true. That is, product development in Cochlear, because of the long development lead times, is increasingly needing to anticipate technology advances. This is contrary to the traditional text books on good product development practice, which recommend decoupling technology development from product development, to ensure that technology risk does not compromise achievement of product development milestones. We no longer have the luxury of such decoupling. We have no choice but to project the progress of technology development and to anticipate that what we need will be available at the time we need it. Not to do this would be run the risk of developing a product which is already previous generation technology at the time of its release.

To some extent, having a technology integrator approach facilitates this anticipatory approach – because the technology development risk is effectively being passed on to those developing the technology which Cochlear will then source and integrate into its own product development process. However, there is an essential element of the internal product development process which is required for this to be an effective approach, and that is Systems Engineering – Cochlear is currently investing in acquiring a broad-based systems engineering capability, which will ensure that, when a product system is delivered to the market, out of the technology integration process, it truly is a system and not merely a loose association of stand-alone product elements. A systems engineer has to deal, not only with the traditional technical aspects of the development, but also have an understanding of, and respond to, all the real world issues in manufacturing, marketing and servicing the end-market product, and in meeting the expectations of all elements of the value chain through innovative and incisive engineering.



*Nucleus 24
behind-the-ear processor*

*... having a technology
integrator approach
facilitates this
anticipatory approach.*

Strategy

Moving now to strategy. The imperative of time, and speed of technology evolution, have changed the nature of strategy, moving it from being a base case linear plan, to being a portfolio of options. In this context, technology is creating strategic headroom, with opportunities more likely to be identified through value chain analysis, rather than the more traditional SWOT analysis.

To enable innovation opportunities to be grasped, strategy must be a continuous process.

Strategic planning is no longer that once-a-year activity which results in a printed tome called The Plan. Rather, it is a continuum, sometimes with fine-tuning, other times with major interventions. At Cochlear, for example, our Plan is formally reviewed three times a year: in October we take a five year view, bringing that to a two year view in March, and a one year view in July. That one year view is tracked monthly, and fine-tuned at the December half year to pick up any new directions coming out of the October review.

There is an increasing tendency today for people to believe that the rate of change is making longer-term strategic views redundant. On the contrary, particularly in the context of a global organisation, having a longer-term strategic view has never been more vital. That view provides an essential source of global alignment and a frame of reference within which the energy of change can be harnessed by the innovation system, rather than being a disorientating and threatening force. At Cochlear, we spend a great deal of time on developing strategy, but also on ensuring that it is as well understood as possible at all levels throughout the organisation. This is done formally and informally, sometimes in longer sessions, other times as part of a five minute update. Strategy has, in effect, its own “conversation” framework within Cochlear.

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People

This brings me to the final and most important dimension – people.

Mission Statement

Partners in Hearing for Life

*Clinic teams and Recipients embrace Cochlear as their **Partner in Hearing for Life**.*

*This choice is made out of continuing preference for the benefits provided by Cochlear's services and products **and** for the values resonated by Cochlear's people.*

This Mission Statement reflects the unique aspect of Cochlear's business. It explicitly recognises that we have to earn the preference of the cochlear implant teams, and of the person who will use our product – and that once that decision is made, a lifetime partnership is established. In the case of a child implanted today, that partnership is likely to last 100 years, and part of Cochlear's responsibility in that partnership is to provide access to new technology over the person's lifetime. This, in itself, requires innovative solutions, because as far as possible, that access needs to be delivered through the external components of the system (the speech processor), rather than requiring a new implant and the associated surgery.

Here Cochlear has the advantage of diversity – we have an enormous geographical and cultural dispersion. Even in our Sydney facility, we have nearly 40 different cultural heritages represented. While the cultural interfaces are not without incident, they do result in more time looking for the *second* right answer. This is a critical element in achieving innovation, because the first right answer is not necessarily the best, nor the most elegant. One of our main regrets, however, is that we cannot attract more women into the engineering stream. We do have a few, but not enough.

It is interesting to reflect on the advantages of the Australian culture as a base for a global business. As a generalisation, we find it is an advantage: it has an openness and a neutrality which often enables it to combine with other cultures in a collaborative way. It has a good mix of European independence, and American process, yielding a high level of inventiveness. As we all know, our challenge is to translate that into innovation ...

As a final comment on people, and linking in with my earlier reference to role definitions, an innovative organisation is likely to be a growing one – in which case, individual roles will be growing too. This is an important dynamic to recognise, because some individuals will thrive and grow with their roles, continuing to provide a high level of performance. Others will not, and yet there will probably be another role in the organisation which is appropriate for them. The key is to anticipate this and make the move before they lose their own self-esteem, and others' confidence, through lack of performance. Having an explicit conversation regularly regarding the changing scope of an individual's role is a way of releasing the pressure before it results in a damaging explosion.

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Conclusion

In closing, I would like to return to the question of sustainability. Progress is not, nor can it ever be, linear. Growth in the real world of technological innovation is geometric. Each day it gets harder for the leader to stay ahead, and each day the leader has to learn to run just that little bit faster, that little bit better, and to take that extra risk – but to manage that risk a little better. This continuous striving to be better is the root source of innovation, in contrast with the apparent new economy paradigm of “get in and get out fast with the cash”, which itself does little justice to the innovation potential of the underlying communication technology base which is emerging. As Jim Collins pointed out in his *Sydney Morning Herald* article last month, in which he contrasted the *Built to Flip* approach with that proposed in his and Jerry Porras’ book *Built to Last* – not only are we observing a growing socio-economic disparity, but more troubling is the perceived decoupling of wealth creation from contribution, and the short-term (hopefully!) diversion of capital to non-contributors. Jim Collins is optimistic – he proposes that the market place will brutally crush any model that does not produce real results. The question we need to address in the context of sustainable innovation in Australia, where the capital markets are smaller, is whether this short-term diversion of capital *and people* will cause a debilitating hiatus of investment in the so-called old economy, much of which is really quite young and full of potential in terms of innovation.

The question we need to address in the context of sustainable innovation in Australia, where the capital markets are smaller, is whether this short-term diversion of capital and people will cause a debilitating hiatus of investment in the so-called old economy, much of which is really quite young and full of potential in terms of innovation.

The Warren Centre for Advanced Engineering

The Warren Centre for Advanced Engineering is an independent, industry-linked institute committed to fostering excellence and innovation in advanced engineering throughout Australia.

It is a self-funding non-profit body operating within the Engineering Faculty of The University of Sydney, controlled by representatives from industry.

The Warren Centre objectives are to:

- Stimulate innovation in the advanced engineering technologies to accelerate Australia's industrial development;
- Encourage the effective deployment and use of new engineering technologies;
- Promote the integration of technology, management, design and enterprise among Australian businesses;
- Provide independent advice and comment on these issues and their impact on development, national policies and enterprise.

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

The Centre's core services include investigation of major technical issues; keeping people informed through lectures, seminars and round tables; and bringing emerging industry groups together to enable cooperation and faster creation of competitive advantage.

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.

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THE **Warren** CENTRE

FOR ADVANCED ENGINEERING



