



Engineers New Zealand

IPENZ Informatory Note Eight

Managing Innovation

August 2002

IPENZ ENGINEERS NEW ZEALAND:

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Why we need more innovation in New Zealand

New Zealand's current economic performance is insufficient to fund both the ever-increasing standards of living desired by our population and the demands for improvements to our health services, education and environment. We are now in twentieth place of the OECD rankings, down from third in the 1950s; and our average income is now 80% of the OECD average, down from 150%.

If New Zealand is to work towards restoring itself to the top 10 of OECD nations in the next ten years we will need to achieve a sustained growth rate of 4 to 6% per annum per person. This means that the economic value of what each and every one of us produces needs to increase by 6% per year. If we can achieve that we will have created new economic capacity equivalent to three new dairy industries.

Growth of this magnitude will not come from competing with low-wage economies in the production and selling of commodities. History shows that over time the market price of most commodities falls relative to goods and services with some form of added value. Therefore economies that largely rely on trade in low-value commodities have to constantly work harder just to maintain the same standard of living.

How are we to achieve this growth? It will not come from continuing to produce tomorrow what we produced yesterday. Successful nations and businesses are those that are constantly adapting, evolving and producing new goods and services to meet the never-ending changes demanded by the market. There is only one way of reaching this Goal – through innovation.

(For more commentary on the macroeconomic background, refer to Informatory Note Five: *Wealth Creation in New Zealand*.)

What is innovation?

There are numerous definitions of innovation, each adding insight into its nature. Some define it in terms of a change process that improves or develops a new product or service: the constant drive to find a better way, but in a way that ensures business growth and financial success. Other definitions frame innovation as an attitude: of taking risks, of not accepting the status quo, of valuing and celebrating improvements that lead to commercial success. Yet others characterise innovation as the creation of wealth through the development of profitable intellectual property.

Applications of innovation

Many people see innovation as applicable only to new products. There are a number of possible applications of innovation. They include:

- **New** products and services
- Improved **performance** of products or services
- **Enhancements** to existing products and services

- Better **design** and **branding**
- Better **channels of distribution**
- Greater **efficiency** in production and service delivery

The most successful companies are those that are innovating across all these areas.

Types of innovation

There are generally two types of innovation. The first and most common is **market-led or market-push innovation**, where market research or other processes identify a need and the innovation process is directed towards meeting it. This could range from solving a major technological problem through a significant research programme, to simply making some minor improvements to an existing product.

The second is **technology-led innovation**. This is where a technological breakthrough, often arising from market-led innovation in another sector, creates an opportunity for a new product or service, but one that the market itself has not yet recognised. A market then needs to be developed for this is innovation.

Key success factors in innovation

The key success factors of best-practice innovation are:

- 1 It has **market value**. Innovation needs to be closely linked with the marketing process – it is no good producing a better or new product if the market does not value the innovation and therefore is not prepared to pay for it.
- 2 It is **unique and protected**. An innovation that is copied by a competitor does not produce a gain to the innovating business.
- 3 It is **systemised**. A business that relies on random “eureka” innovations is less successful than one that has processes in place to ensure regular and constant innovations.

Innovation systems

The most critical point about innovation is that only people can do it. Innovation is a uniquely human activity and cannot be done by machines. Good innovation systems are focused on recruiting and retaining highly skilled and trained staff, giving them access to knowledge and then encouraging and enabling them to think and act innovatively.

Therefore the key components of an effective innovation system are:

1. An **organisational culture** that values innovation, where there is implicit encouragement for staff to think differently, take calculated risks and challenge the status quo.

2. **Responsibility** for innovation is **placed on all staff**. While some roles will be more directly involved in innovation (e.g. research and development, product development) all staff should have a mandate to act innovatively within their roles (i.e. suggest and implement improvements to process or products).
3. **Human resource systems** that develop and encourage staff to be innovative. This requires a dedication to training, education, mentoring and the rewarding of staff for innovative behaviours. Staff also need time and resource allocations to stop and think about new ideas, which will not happen while they are giving 100% of their time to the daily routine.
4. A **performance measurement system** that measures the innovative pulse of a company. Simple measures that are often used include spending on innovation (often labelled R&D expenditure), new product percentage (number of new/changed products introduced this period as a proportion of total product numbers) and number of patents held.
5. **Linkages with the marketing function**. Understanding the customers, their needs, and the competition is critical for targeting resources to the innovation systems. The most successful innovators understand the customers needs better than the customers themselves. They are often able to identify and solve problems before the customer has realised that perhaps there is a problem, let alone thought about buying a solution.
6. **Knowledge acquisition** and management processes that constantly bring into the organisation new ideas, information, concepts and knowledge. This can range from simple things such as receiving trade, scientific, engineering and professional magazines, attendance at conferences and participation in industry networking forums right through to having a comprehensive research capability. Where knowledge is not readily available, polytechnics, universities and research institutes have the capabilities for developing it for you.
7. **Intellectual property management systems** that identify, protect, value, manage and audit the organisation's intellectual property (IP). This intellectual property is the new knowledge that arises out of the innovation process e.g. it may be a unique understanding of a production process that facilitates superior efficiency or design in a new product. Some organisations have difficulty in identifying their IP. One way of doing so is answer the question: what do we know that our competitors don't and that we don't want them to know? Once identified, it needs to be protected or the competitors will find out! Protecting your IP can range from simply keeping it confidential through to the more formal means such as

trademark protection, patents and plant variety protection.

8. **Collaboration** with other organisations who can contribute to innovation processes. Most organisations cannot achieve best-practice innovation working in isolation. They need to work with research providers, tertiary education institutes, associated and support industries and even their own competitors. Clustering of similar organisations and their support industries is a proven tool for ensuring collective growth by sharing those parts of the innovation process where their interests overlap. This may require collective ownership of the IP that arises from that sharing.

Responsibility for designing and implementing the innovation system rests with the organisation's executive management who need to display strong support for innovation as well as applying it in their own roles. The organisation's governing body, e.g. Board, should ensure that the executive has put in place an innovation system and that it reflects the strategic direction of the organisation.

Resources

There is a range of resources available to support innovation practice in New Zealand.

Government Agencies and programmes with an innovation focus:

BIZInfo (information, mentoring, networking and training) –

www.bizinfo.co.nz

Crown Research Institutes

AgResearch - www.agresearch.cri.nz

Crop & Food Research – www.crop.cri.nz

Institute of Environmental Science & Research – www.esr.cri.nz

Forest Research – www.forestresearch.cri.nz

HortResearch – hortresearch.cri.nz

Industrial Research – www.irl.cri.nz

Institute of Geological & Nuclear Sciences – www.gns.cri.nz

Landcare Research – www.landcareresearch.cri.nz

National Institute of Water and Atmospheric Research – www.niwa.cri.nz

Foundation for Research, Science and Technology (R&D grants, TechNZ, Tech Link, Technology for Business Growth) –

www.frst.govt.nz

Industry NZ (BizEnterprise Awards, Cluster Development)–

www.industry.govt.nz

Intellectual Property Office of New Zealand –

www.iponz.govt.nz

Regional Economic Development Agencies (cluster and regional partnership development, mentoring, networking) –

www.edanz.org.nz

Skill NZ (Industry Training, Modern Apprenticeships) –

www.skillnz.govt.nz

Business, Professional and Trade Organisations

Business NZ – www.businessnz.org.nz

Designers Institute of New Zealand – www.dinz.org.nz

Industrial Trade Organisations – [www.skillnz.govt.nz/
resources/itos/itos.htm](http://www.skillnz.govt.nz/resources/itos/itos.htm)

IPENZ Engineers NZ – www.ipenz.org.nz

Conclusion

Competing with low-wage economies in the production of low-value commodity goods and services will not deliver the required rates of economic growth. Substantial future growth lies in our ability to “innovate”, to use knowledge as a competitive advantage. Our national goal must be to move from a few innovators succeeding against the odds to full realisation of the potential competitive advantage of our innovation.

Managing the innovation process is a critical management activity. It involves ensuring that the culture, human resource systems, performance measurement and intellectual property of the organisation are all directed towards achieving sustainable innovation.

Organisations need to look at developing business, research and education partnerships, and clusters with related businesses to work collectively towards enhancing each other's contribution to innovation.

There are many resources available to fund and assist in the development of innovative-focused business. Make use of these.

Other Informatory Notes

Note One: The Role of Engineers in Developing National Wealth

Note Two: Policy and Leadership Framework for Wealth Creation in New Zealand

Note Three: The Role of Technology Education in New Zealand's Future Prosperity

Note Four: Sustainability and Climate – An Engineering Response

Note Five: Wealth Creation in New Zealand Improving Intellectual Property Realisation

Note Six: Climate Change and the Greenhouse Effect

Note Seven: The Drive for Innovators and Entrepreneurs: School governance and technology education

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