

DESIGN AUDIT BY RESEARCH. BUILDING A KNOWLEDGE BASE FOR COMPETITIVENESS BY DESIGN

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Introduction

New Zealand, being at the edge metaphorically speaking due to its extreme location at the edge of the Pacific has freedom to improvise, to innovate, to imagine. Being at the edge poses the challenge to business of connectivity to the world while remaining separate and individual, balancing the tensions between local and global, traditional and international. Design is under utilized by New Zealand business and industry. New Zealand business must become design enabled to realize its potential in an increasingly borderless and dynamic world economy. Design audit by research can provide a knowledge base for building the design enabled business, utilizing innovation, imagination and creativity, which are attributes of New Zealand design culture, and have the potential to create value and become enablers for economic success. This paper will suggest a framework for development of design audit tools and methodology by research - a knowledge base on which to build a design and innovation culture. The design audit develops a framework for establishing design culture as an enabler for business to build and sustain a competitive advantage by design. The design audit framework establishes the knowledge base for enabling design capability in business. The proposition is that cultural factors are an important enabler in the process of establishing a design and innovation nexus. Existing models emphasize the evaluation of visual evidence. This paper will propose a framework which incorporates multi-cultural design research factors in collection and evaluation of evidence.

Developing Leaders for Innovation

Background and Benefit to NZ

Design has been identified as an activity of broad national importance within the New Zealand Government's Growth and Innovation Framework (GIF), and is expected to add value to a wide range of industries. The Government recognizes that innovation, imagination and creativity will be the driving forces to get New Zealand back into the top half of the OECD¹ in terms of per capita income. Victoria University School of Design is forming partnerships with leading academics at international universities who have these qualities, allied with a global focus, and a real ability to make a difference to economic growth, to establish a postgraduate program to train skilled professionals for key roles in international design business.

Creative Interdisciplinarity

Design for competitive advantage in the 21C demands moving beyond organizational and functional boundaries as well as cooperation with many professionals in different fields and occupations. New Zealand, to be competitive in the international arena, needs to use design creatively and innovate continuously - combining skills from many different disciplines. Because of the growing importance of collaborative work, the ability to function effectively in teams constitutes a critical workplace competency for new graduates. Moreover recent research puts

¹ The Organisation for Economic Co-operation and Development is a unique forum where the governments of 30 market democracies work together to address the economic, social, environmental and governance challenges of the globalising world economy, as well as to exploit its opportunities. <http://www.oecd.org>

special emphasis on the significance of social interaction in learning.² Establishing a design culture in New Zealand as an enabler for business to build and sustain a competitive advantage by design, requires the development of a corresponding research framework. At Victoria University School of Design, the framework in development incorporates a new Master of International Design Business Management (MIDBM) and practice-based PhD to respond to this need, creating a new research platform integrating design, business, and technology for creative interdisciplinarity. Springing from the needs of industry, the MIDBM and PhD programme builds upon the successful Growth Pilot³ - Design-Led Futures – in progress at undergraduate level in the School of Design, to give postgraduate students the opportunity to develop important design leadership skills through projects and courses, working with international experts and New Zealand Small and Medium-Sized Enterprises (SME). The proposed framework for postgraduate design research will benefit New Zealand by developing leaders for innovation, supporting Small and Medium-Sized Enterprises (SME) through design leadership, to enable more competitive and responsive international industries, and ultimately, by contributing to New Zealand's sustained cultural development and economic success. The framework for research brings together international experts in diverse fields within the concept of design research and design business management, linked to a new international network⁴ of leading international academics from universities in the USA, Asia and Europe. The intrinsic value of the network is that its members combine multi-cultural expertise in design learning strategies, design research and design pedagogy, with global design business management expertise, and market insight encompassing Europe, Asia and the USA. The network gives access to multi-cultural knowledge to create a nexus for postgraduate design research in New Zealand, connecting leading design educators, the design profession, and Small and Medium-Sized Enterprises (SME), ultimately to enable the design and development of desirable products and services that will offer competitive advantage in new overseas markets.

The Challenge of Connectivity

Internationally, the growing role of knowledge in the economy, particularly the easy access to published research, is leading to greater networking and co-operation between countries. The development of inter-cultural awareness becomes an ever more important factor in the education of the next generation of designers. We cannot be intuitive about another culture. We must engage in inter-cultural research. Design is transforming from a skill-based activity to a knowledge-based activity. The complexity of problems designers are called upon to address is increasing rapidly. Knowledge rather than intuition is the driver in a period of radical innovation and technological sophistication. Greater inter-dependence among countries and their citizens, and reduction in the costs of distance, is changing the way the world relates and can relate. Countries and corporations alike operate in an increasingly borderless and dynamic world

² Situated Cognition and the Culture of Learning: John Seely Brown, Allan Collins, Paul Duguid <http://www.ilt.columbia.edu/publications/papers/JohnBrown.html>

³ The Growth and Innovation Pilot Initiatives (Growth Pilots) have been introduced in New Zealand to help build the capability of Tertiary Education Organisations (TEOs) to underpin the development of the government's Growth and Innovation Framework's (GIF) focus sectors. These focus sectors include biotechnology, design, and information and communication technology (ICT), as sectors in their own right, and as key technologies that can enhance the growth prospects of New Zealand's wider economic base. The intention of the Growth Pilots is for TEOs to work with businesses to design an approach that will best suit their specific circumstances and capability requirements.

http://www.tec.govt.nz/funding/strategic/growthpilot/growth_pilot.htm

⁴ A new international network, NELDRIC (Network of Leading Design Research and Innovation Centres)

economy. Distinctions between centre and periphery have become blurred. This is the paradox of the 21C. Distance is in the mind. The relative isolation of New Zealand in the world confers some advantages. Through necessity people have developed self-sufficiency. People are generally open to different cultural viewpoints and receptive to new ideas. It has created one of the world's great experimental cultures. But, New Zealand companies tend to under-invest in design. Investment in design is often seen as risky. Direct benefits are difficult to quantify. Being at the edge of the Pacific poses the challenge of connectivity to the world while remaining separate and individual. Ideas accumulate at cultural boundaries. Change happens at the edge. It is the enrichment of cultural variety and density of ideas at the boundary between nations and communities - the edge effects - that New Zealand needs to understand and exploit, to build upon its successes, by promoting basic and strategic human-centered research in areas where New Zealand has unique strengths; and by forging international alliances, creating centers of design excellence with skilled researchers, connecting to the global supply of ideas and innovations to promote greater inter-cultural awareness and understanding.

International Context

New Zealand's Minister of Economic Development, the Hon Jim Anderton⁵, speaking about the government's commitment to working in partnership with innovative and creative businesses to unleash the creativity of New Zealanders, compares New Zealand's domestic market with the OECD market by drawing a 2,200 kilometre circle around Helsinki - which takes in 300 million of the world's wealthiest consumers – and by drawing a similar circle around New Zealand, taking in 4 million people, and lots of fish and penguins. It is an interesting paradigm that highlights a particular New Zealand mindset - the perceived remoteness and isolation of New Zealand in the world. To compete internationally New Zealand must develop an external market using design innovation for competitive advantage. To maintain competitive advantage in the new economy New Zealand needs to develop new products that respond to different cultural and social criteria. Design research is needed to found the knowledge base on which to build a design and innovation culture. I am going to call that knowledge base the cultural software and know-how needed by New Zealand SME's to build a platform to operate in new overseas markets.

New Zealand has looked to Scandinavia as a benchmark for good practice for nearly 40 years. Dr William Sutch⁶, an intellectual who set down a distinctive and influential vision of New Zealand's economic and social development wrote, “for economic reasons New Zealand must develop an internal market which demands the New Zealand equivalent of the kind of style, quality and design that the Swiss, Danes the Finns, and the Swedes Demand.” I believe Sutch was right in looking to Scandinavia, in terms of scale and direction, as a benchmark for good practice, and Sutch's insight is equally valid in the quest to develop an external market for New Zealand SME's in today's global economy

⁵ New Zealand Minister of Economic Development Hon Jim Anderton: Closing remarks for seminar on “International Connection and New Zealand Business” and Launch of Growth Innovation Framework, (GIF) website. 5 May 2004.

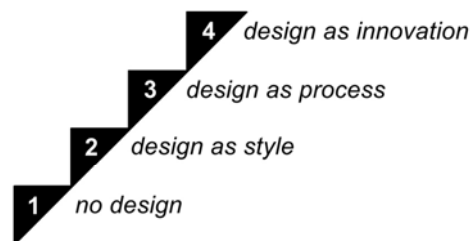
<http://www.gif.med.govt.nz/reportspublications/speeches/20040505-anderton.asp>

⁶ William B Sutch, 1966 Colony or Nation, Sydney, Sydney University Press.

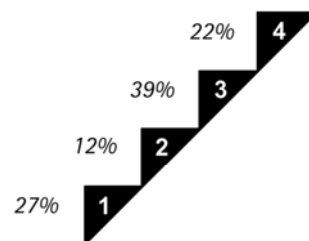
Design Research in the Global Economy The Scandinavian Experience

As the information age transitions to an era in which society considers user-experience is at the centre, intercultural awareness becomes paramount to design thinking and design research methodologies. A framework for postgraduate design research which incorporates multi-cultural design research factors needs to be evolved. According to Rolf Jensen⁷ Director of the Copenhagen Institute for Future Studies, future demand for goods and services will focus on emotional wealth when material wealth has become commonplace in society. This perception parallels the work of Pine & Gilmore.⁸ The design focus is shifting from commodities and services towards immersive experience in design. This development provides a new arena for evolution of design research methodologies to enable the corporate sector in New Zealand. Design has become a strategic target area for New Zealand, politically and within industry and education. In Denmark the perception of the designer as an individualist has been questioned by the Confederation of Danish Industries,⁹ commenting in, 'From Beauty to Business'¹⁰ that the artist-craftsman tradition carries too much leverage over industry needs, and design schools are missing out on international development. The report identified the need to establish larger design consultancy corporations that have the resources to develop methods and tools to compete internationally. The Danish Design Centre published in 2003 the outcome of research on the, 'Economic Effects of Design' in Denmark as an intervention in the economy in the form of a Design Ladder.¹¹

The Danish Design Ladder Model, (Figure 1) is a useful four-step model for grouping companies' design maturity on the basis of their attitudes towards design. The higher a company is on the ladder, the greater the strategic performance design will play.



Design Ladder - Denmark
Figure 1



Design Ladder - Sweden
Figure 2

The first step of the Danish Design Ladder represents non-design, where design is a negligible part of a company's business. The second step is where design is seen as styling solely relating to the final physical form of a product. Sometimes the final form is the work of a designer, but

⁷ Rolf Jensen, 1999, Dream Society, McGraw-Hill

⁸ Pine & Gilmore, 1999, The Experience Economy

⁹ Denmark in the Culture and Experience Economy, September 2003

http://www.kum.dk/graphics/kum/downloads/Publikationer/Publikationer_ENGELSKE/experience_economy.pdf

¹⁰ Confederation of Danish Industries, 2003, From Beauty to Business

<http://www.di.dk/Service/Publikationer/Produktside/?productId=2774>

¹¹ Danish Design Centre, 2003, The Economic Effects of Design - Design Ladder Model

usually created by others within the company. Companies on the third step of the Design Ladder use design as process. In this case design is not a result, but a method integrated early into the development process, requiring contributions from a range of specialists, and influencing the production outcome. Companies on the fourth step of the Design Ladder are using design as innovation, where the designer works closely alongside the company's owners and management on complete or partial renewal of the total business concept. The Danish Design Centre study shows that the higher a company is on the ladder, the greater the strategic performance design will play. A company on the design as innovation step, considers design to be of such critical importance that it will reformulate some or even all aspects of its business.

A further study carried out for the Swedish Industrial Design Foundation¹² and Association of Swedish Engineering Industries, looked at the use of design in manufacturing and service companies and used the Design Ladder Model to report the results, (Figure 2). The report shows 3 out of 4 Swedish companies surveyed invest in design. Companies at the top of the Design Ladder, using design as innovation, represented 22% of the companies surveyed. What is clear from the Swedish study is that companies display higher growth and profitability if positioned at the top of the design ladder, and Swedish companies that invest in design export more. The Swedish survey shows there is little difference in Sweden between manufacturing and service companies towards use of design. A relatively high number of Swedish companies buy design and exhibit a greater degree of design maturity compared with New Zealand.

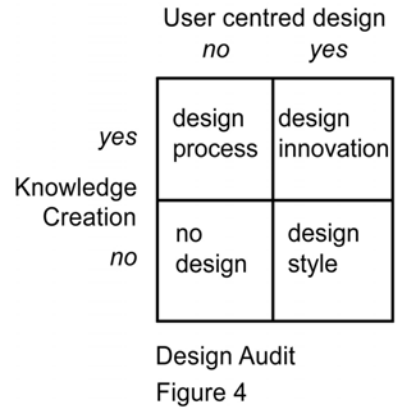
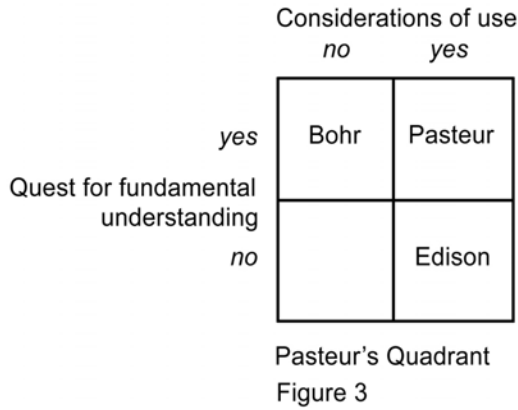
Design Audit by Research

Using the Design Ladder model from Denmark as a starting point, I will describe the evolution of a possible framework and methodology for design audit by research. I am going to build a design innovation framework around the Danish Design Ladder, to create a methodology for auditing competitive advantage. It is a knowledge framework based on human centered design. The Danish and Swedish surveys established that, the higher a company is on the Design Ladder, the greater the strategic performance design will play. We are aiming for the top step where design innovation is most effective, and design is of such critical importance that it can reformulate some or even all aspects of business. Lets look at expanding the knowledge base, and see how this can be done by reference to the work of Donald Stokes at Princeton University.

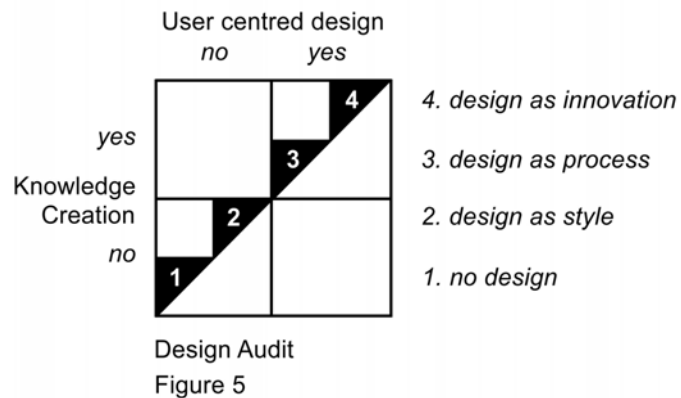
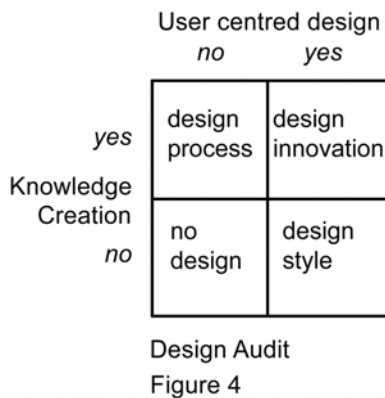
Design audit by research needs to reflect a complex interweaving of basic, applied, and use-inspired basic research. Pasteur's Quadrant, (Figure 3) envisioned by Donald Stokes¹³ offers a model for thinking about the types of design research that can and should be done to create competitive advantage.

¹² Swedish Industrial Design Foundation and Association of Swedish Engineering Industries, 2003, Swedish Companies on Design, Attitudes, Profit and Design Maturity.
<http://www.svid.se/wlt/620B19B0-697E-4A7C-A4AE-C0BA8B5511F7.wlt?ref=B722B72C-B43B-4F93-8BCC-038072BA46EA&rid=91ECF5D6-8C38-4083-A445-2069E7F611A3>

¹³ Donald E. Stokes, 1997, Basic Science and Technological Innovation, Brookings Institution Press



Let's look at where these quadrants are and what they imply. Each quadrant influences all the others. The first quadrant encompasses what we traditionally think of as basic research. Stokes calls this Bohr's quadrant, because it has much in common with the early work of Niels Bohr on atomic structure. This basic research could be characterised by a pure voyage of discovery, a quest for understanding, with no thought for practical use. The second quadrant is Edison's quadrant. Researchers in this area are more interested in making something work or in solving a practical problem and less concerned with connecting research to a larger theoretical method or process. This is traditional applied research, with applied goals; no search for general understanding of phenomena in the field, research narrowly targeted on immediate applied goals, sophisticated in nature and targeted with commercial goals in mind, not a pursuit with deeper implications. The third Quadrant, and most significant quadrant is Pasteur's quadrant. Louis Pasteur, thought of as the father of microbiology. Few people have done more to alter our basic understanding of life processes. Pasteur's research is use-inspired basic research, devoted to solving problem; to finding solutions that improved the lives of the people around him. Pasteur's research is characterised by a drive towards understanding, inspired by considerations of use, having a combination of goals. Pasteur's Quadrant is the nexus of strategic research, in the upper right hand quadrant where design innovation is most effective, (Figure 4). This coincidentally is the top of the Design Ladder. We now have a conceptual model for expanding the knowledge base, and by integrating Pasteur's model with the Design Ladder we can create a framework for design audit by research, (Figure 5)



combining a quest for fundamental understanding with knowledge creation, in a user centered context, to identify opportunities for design leverage.

Thinking about innovation from a systems approach highlights important factors that impact on how innovation actually occurs in the economy. Companies do not innovate in isolation but in interaction. Innovation involves creativity, can be unexpected, but design of a complex product or service is not the consequence of any one individual, it requires the combination of the highest quality creative professional skills brought together in a mutually supportive non-hierarchical way. Interactions of culture, fundamental beliefs and value are implicit in design audit research aimed at establishing a knowledge platform for corporate success in the global arena. Schein¹⁴ believes that we must understand shared assumptions to understand the culture of an organisation, that culture is a pattern of assumptions learned to solve problems, concealing hidden values, strategies, goals, philosophies, beliefs that are taken for granted. Developing a design and innovation culture in New Zealand, including the tools and methodology for consistent design success to give competitive advantage in the international arena, will require these assumptions to be challenged. Standard audit discovery practice in collection and evaluation of evidence, including the evaluation of visual evidence, is unlikely to reveal critical factors for, 'Success by Design' in the international arena, unless the evaluation is advised by a network of experts combining multi-cultural expertise in design audit research, with global design business management expertise and market insight. The proposed Master of International Design Business Management (MIDBM) and practice-based PhD framework for design audit by research will enable the development of know-how and the cultural software to make the critical difference for 'Success by Design.'

Success by Design

New Zealand investment in research and development accounts for less than 0.1% of total global investment in research. If we compare investment in research and development in Scandinavia, we see that according to the OECD Science, Technology and Industry Outlook,¹⁵ Sweden invests nearly 3.5 times as much, and Finland 2.5 times as much as New Zealand. To be competitive in the international arena New Zealand designs must communicate cultural significance and value to the user, be knowledge intensive, technology innovative, and ecologically aware. Business must be capable of evolving products that create value, focusing on the human side of knowledge interaction and the experience that the product or service offers. The New Zealand Government 2003 Design Taskforce¹⁶ set out a strategy in, 'Success by Design' to raise the awareness of design as a key enabler for industry in New Zealand, and became an essential part of the Government's vision to integrate design into business. Design audits, to reveal existing and potential design capabilities or intellectual property in Questor¹⁷ businesses, and a mentoring programme, to build design capability and provide a knowledge base for development of business models, are a key part of Government strategy to establish New Zealand in overseas markets. The Design Taskforce initiative recognized that establishing an effective design culture within the organization is the most important step in the process of New Zealand becoming design enabled,

¹⁴ Edgar H Schein, 1985, *Organisational Culture and Leadership*, Jossey Bass Wiley

¹⁵ Organisation for Economic Co-operation and Development, OECD, Science, Technology and Industry Outlooks http://www.oecd.org/document/35/0,2340,en_2649_34273_1894499_1_1_1_1,00.html

¹⁶ Success by Design, 2003, Report and Strategic Plan from the Design Taskforce, in partnership with the New Zealand Government, in support of the growth and innovation framework, (GIF).

¹⁷ Integrate Design Research Report, Innovation and Systems, 2002, Questor: businesses aspiring to succeed internationally as exporters. <http://www.nzte.govt.nz/common/files/design-taskforce-report.pdf>

and that design capability cannot change without addressing the culture and values within the organisation.