Innovation from Design

The application of design and product development among small to medium sized manufacturers in the Great Southern region of Western Australia

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THE UNIVERSITY OF WESTERN AUSTRALIA | GSM

CEMI REPORT

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Executive Summary

The intention of the project is to produce a report that recommends the strategic integration of design and product development into the Great Southern region's innovation system, which will be accessible by firms to produce products utilising a variety of capabilities and resources. It is likely that only through continued cooperation and partnerships, will the sustainable production of well-designed products and market success, be achieved.

Creating a market for design and other related professional services, means that these knowledge intensive industries will be complementary to the innovative manufacturing sector in the Great Southern region that already cultivates significant capabilities and expertise in light manufacturing (e.g. stainless steel, agriculture machinery), natural resources (e.g. timber, wool); and art and design (e.g. architects, craftspeople, graphic and multimedia designers). Encouraging partnerships between industry operators with interests in good design can also enhance the possibilities of market outcomes that will contribute to the growth of the industry and region.

Design is a crucial tool in the development of a thriving manufacturing sector capable of entering new markets and being sustainable and profitable in the long term. The great southern region's manufacturers' understanding and use of design as an integrated business process is relatively underdeveloped. This is due to a number of factors including a lack of design expertise within companies, perceived lack of design services within the region, management awareness of the design process and time constraints.

The recommendations generated from this exploratory report will provide a foundation for future research and may serve as a useful platform from which to launch a major funding application to obtain further design and product development initiatives established in the area. In order to grow the design culture within the manufacturing industry, as a whole there is a need to facilitate awareness, improve access to expertise and partnerships amongst manufacturers, and between manufacturers and design professionals.

A 'Great Southern Product Development Centre' may provide the focus, networks and access to expertise and funding necessary for the establishment of a range of design services to complement the growing manufacturing sector within the region.

SECTION 1

"In the language of business, design creates a more competitive product. In the language of the user, design makes a product a better product. And in the language of the people who work in a creative enterprise, the design process itself also creates, as a by-product, a better place to work."

Quote from "Success via Design", produced in collaboration with the Danish Design Centre, Design Management Institute and Harvard Business School

Introduction

This report is the culmination of a six-month exploratory study into the management of design and product development within small to medium manufacturing firms in the Great Southern region. The aim of the research was to examine opportunities to increase the level of competitiveness of the region's businesses via the strategic management of design and product development processes in the manufacturing sector.

The implications of this study are relevant to both industry and government as the effective management of design and product development processes represent critical ingredients that can improve the performance and competitiveness of manufacturers as well as advance the region's capacity to compete in domestic and export markets. The Great Southern region of is rich in natural resources and boasts a strong innovative culture. Hence, developing a design conscious industry that will transform these resources in an economically and socially sustainable manner is critical for the ability of the region to grow and prosper.

Design, whether it is focused on product enhancement, packaging or related areas, should be integrated into the overall cycle of new product or market development. Unfortunately, design is frequently undertaken in an ad hoc or with indifference by most Australian firms. Small to medium sized enterprises (SME) in particular, experience difficulties with issues such as finding the right mix of products and markets in their aim for growth. In view of this, the application of effective design has become increasingly important as a "value-added" factor that can differentiate products by enhancing market appeal, improve the manufacturing process and boost sales performance. For example, a study of innovation and product development at 245 manufacturing sites in the United Kingdom and Germany, Voss et al. (1996) concluded that strong design practice leads not only to strong design performance, but also improved business results.

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- The Great Southern Area Consultative Committee (GSACC)
- The Great Southern Development Commission (GSDC)
- The Small Business Answers initiative (SBA)
- The Great Southern's three regional Business Enterprise Centres (BEC)

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Case Study Participants

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- Steve Brown (CEO), *AQ2 Pty Ltd*
- Chris Speight (Technical Director), *AQ2 Pty Ltd*
- Gus and Julie Hook (Proprietors), *Bakers Junction Engineering*
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- Dean Malcolm (Proprietor), *South Coast Wood Works Gallery*
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The remaining sections of this report describe the conduct and findings from the research:

Section 2 – Outlines the research objectives and the methodology used;

Section 3 – Reviews relevant literature relating to the value of design; the best practices for design success; and introduces the knowledge component, which may presently be the missing link in establishing design best practice;

Section 4 – Describes the role of design and product development processes within the selected nine firms in the form of case studies;

Section 5 – Presents a summary of key findings made from the nine case studies. Also presented, is an integrated model of linkages that illustrates the current landscape of the manufacturing sector in relation to the nine firms operating in the Great Southern Region. Main discussion points from focus group and workshop held are represented towards the end of this section;

Section 6 – Offers some preliminary recommendations for future action.

Research Objectives and Methodology

The following sections provide an overview of the objectives and methodology used throughout the research project. The objectives of the project are briefly outlined in order to give an overview of the research conducted. In addition, the methodology describes the number of cases selected, use of common interview protocols, data capture and analysis, and its limitations.

Objectives

This study examines the current use of design within the manufacturing industry in the Great Southern Region and the opportunities to enhance the level of innovation and international competitiveness of the industry via the use of strategic design in product and process development. In order to accomplish this task, the following research objectives were developed:

- To examine the **use and role of design** – with particular focus on its application in current design and product development processes adopted by participating firms
- To review international **best practice** in the use of design for enhancing business competitiveness
- Examine the application of **professional design and product development services** among firms

It is hoped that the research results will provide a foundation for the recommendation of future strategies aimed at enhancing the manufacturing sector's strategic use of design and its effective management.

Research Methodology

This exploratory research involved a literature review and the analyses of data presented in the case studies. A qualitative case study method was chosen. The study was carried out with eight case studies and focused on the use of design by manufacturers and designer-makers in the Great Southern region. The cross-case study analysis approach used a process called 'pattern matching' where the researcher looked for thematic 'replications' of theoretical propositions as suggested by the literature reviewed (Yin 1994; Aguinaldo et al 2001).

According to researchers, a case study approach would best explain the complex nature of the 'know-how transfer' and studies where a degree of flexibility is required for the subject matter considered (Aguinaldo et al 2001; McPhee 2002). Due to the complex nature of design activities, with its overlapping interactions with other business processes, a qualitative approach was selected to explore issues that arise in a given context – with intention to gain some insight into how the participants understood the role of design in their businesses, their problem solving processes and their systems of communication and interaction.

The research employs multiple case studies (Yin, 1994) that can be used to `develop pertinent hypotheses and propositions for further inquiry'. A multiple case design was chosen, as the circumstances to be studied were likely to bear more convincing and vigorous evidence than a single case design (Aguinaldo et al 2001).

Data Collection and Analysis

The approach of the study combines qualitative interview-based primary data collection supported by supplementary secondary data (Yin 1994). The research involved a broad cross-section of manufacturers and designer-makers selected by the Great Southern Area Consultative Committee (GSACC), the Great Southern Development Commission (GSDC) and the Albany Chamber of Commerce and Industry (ACCI). Participants were nominated because of their association with the Light Industry Cluster Development initiative conducted by GSDC in 1999, and others of their involvement with Craftwest's "Designing Futures" event in August 2002. All were identified as key manufacturers and designer-makers in the region.

Primary data was gathered using semi-focused open-ended interviews with nine SME (listed in Appendix 1). The interviews lasted on average for one to two hours and were accompanied by on-site visits to each of the businesses. Taped recordings of the interviews were used in conjunction with handwritten notes in order to increase the reliability of the research method as it enabled the researcher to verify the information collected on the tape. Other primary data was collected by telephone and e-mail to fill in any gaps with the interviews. The recordings were transcribed and coded into thematic sections.

The collection of secondary data included corporate literature and supporting documentation such as Internet, newspaper and magazine articles. The interview agenda included main issues such as the background of the respondent and business; the role design plays in the business; an overview of product development processes and supporting activities.

It can be argued that the limitations of only including nine companies within such a broad and fragmented manufacturing industry may constrain the depth and quality of the conclusions and recommendations of the project. In addition, the brief time spent with interviewees may not provide enough depth when it comes to overall design usage. By maintaining what Yin (1994) terms as 'a chain of evidence', the risk of bias on the researcher's part in interpreting and reporting on direct observations and tacit responses of the participant was mitigated

The reliability and validity of the project is dependent on this use of 'multiple sources of evidence' (Yin 1994), the creation of a case study database containing the outcome of the interviews and maintaining a chain of evidence involved the transcription of tape recordings and interview notes – indicating that there is a chronological order where an external observer can follow the derivation of any evidence from initial research objectives and questions to eventual case study conclusions. Based on the above, the conclusions and recommendations of the project should therefore be considered both reliable and valid.

SECTION 2

Literature Review

> *"Cows, after you've seen them for a while, are boring. They may be well-bred cows, Six Sigma cows, cows lit by a beautiful light, but they are still boring. A Purple Cow, though: Now, that would really stand out. The essence of the Purple Cow -- the reason it would shine among a crowd of perfectly competent, even undeniably excellent cows -- is that it would be remarkable. Something remarkable is worth talking about, worth paying attention to. Boring stuff quickly becomes invisible."*
>
> *-- In Praise of Purple Cows, Seth Godin*

Introduction

Today's consumers have increasingly high expectations of new products and services, where quality is a given. It is no longer enough to use quality as a capstone for value and differentiation as consumers desire more personalised and customised products. In view of this scenario, manufacturers are scrambling to cope with their demands by accelerating new product development and delivery cycles to boost product offerings.

Faced with local and global competition, manufacturers have to enhance their competitiveness by identifying new opportunities and commercialise their innovations. Manufacturers are also realising that it is not good enough to be innovative, as competition becomes fierce, they must find ways to create value through delivering more distinctive and user-centred products by integrating superior design and product development strategically into the overall manufacturing process.

Design is a business resource that is often under-valued and under-managed in small to medium-sized firms (SME). This section of the report aims to provide some insights into why strategic design use in product development is absent or not fully developed as a valuable resource to SME in the manufacturing industry. It will also review a set of best practices on how effective design management can add value and create superior competitive advantage for firms. There is also discussion on how manufacturers and designers can overcome differences in culture and practice, in order for them to collaborate more successfully and to amass the necessary knowledge and skills that can lead to continuous learning and innovation.

The literature has identified some of the more obvious barriers to using design effectively in SME that arise from differences in culture, work practices and mindsets. The other challenges that smaller firms face can result from a shortage of resources (time, finances), knowledge and skills on how to access and deploy design services and the lack of awareness of what design can actually do. This paper is by no means isolating design as the only basis for enhancing competitiveness – but proposes to bring to the fore this latent resource that represents great opportunities for smaller manufacturers.

Defining Design…Mission Impossible?

What is design? According to Paul Rand (1993) – the distinguished designer of the IBM and Westinghouse corporate identities,

> *"Design is both a verb and a noun. It is the beginning as well as the end…To design is much more than simply to assemble, to order, or even to edit, it is to add value and meaning, to illuminate, to simplify, to clarify, to modify, to dignify, to dramatize, to persuade, and perhaps even to amuse."*

From this we can infer that design is duality and paradox wrapped into a single word. In all attempts to define it, it is necessary to justify 'design' within the context in which it is presented. Apart from refusing to be pinned to a definition, design is often misunderstood because it applies to a wide range of disciplines: from engineering and industrial design to graphic and architectural design and so on. Broadly, in a manufacturing context, design can be described as the activity that can revitalise or redefine – the processes, practices and products that a firm has to offer (Viladas 2002). More narrowly one can describe design for manufacture as the way things operate as well as how they appear (The Australian Academy of Design 1995).

Based on the assumption that design is a multifaceted concept, a working definition for this paper is provided by Thomas Walton (2002)

> *"Design is both process and product. It is a way of thinking synthetically, of looking at problems in unexpected and creative ways, and seeking innovation. It is also about specific outcomes – products, graphics, communications, and environments. More broadly, it is about how consumers and stakeholders experience these outcomes…the design interface must be all these things –a strategy for action, as well as the results of those actions and decisions."*

The Value of Design

In the past, quality and cost were the primary benchmarks for manufacturers. Today, however, with rapid technological advances, proficiency in those areas can no longer guarantee success. Manufacturers must now differentiate themselves through developing distinctive products and processes in order to gain sustainable competitive advantage. To achieve this, firms have to uniquely combine resources and capabilities that are difficult for competitors to imitate (Porter 1980; Anonymous 2000). A way for achieving this is through effective design usage and to engage in continuous innovation. Moody (2001) suggests that integrating design in manufacturing is a competitive advantage only if the 'fit' is right, in order to develop new products better and faster, design should be strategically integrated into the product development process early.

> *"Design is a potent strategy tool that companies can use to gain sustainable competitive advantage. Yet most companies neglect design as a strategic tool. What they don't realise is that design can enhance products, environments, communications, and corporate identity." (Kotler and Rath 1984)*

In this case, it can be inferred that design can play a critical role in the success of a product. However, good design alone is not sufficient to ensure market success (Weiss

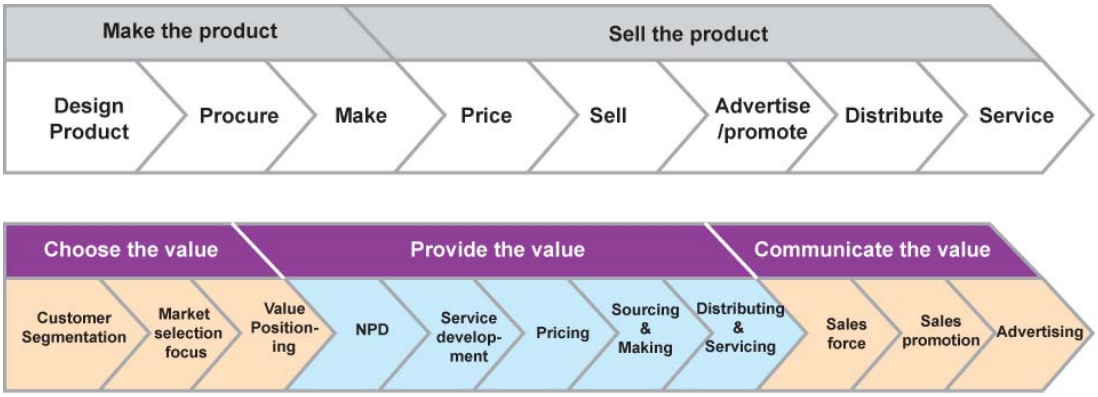
2002). Other factors for a product's superior performance involve creating customer awareness, and addressing the customer's experience with the product through after sales support. When there is long-term commitment to make the delivery of value as an inclusive process and to address the total customer experience, the prospect of success increases significantly (Walsh et al. 1988; Piirainen 2001; Weiss 2002).
On the other hand, Weiss (2002) points out that commitment to delivering value to the end user through outstanding design is not enough, as,

> *"Good design is not always good business, if larger strategic issues aren't being taken into account when new products are developed…(which) involves the concurrent exploration of issues associated with user desirability, technical feasibility, and business viability by an interdisciplinary team that utilises design-based processes and communication tools."*

Weiss explains that business processes have often been disconnected from the 'innovation equation', which ultimately lessens the systemic impact of integrated design activities when it is not 'aligned' with an organisation's strategic objectives and competitive positioning.

Porter (1980) confirms this by adding that value lies not in the discrete activities that a firm performs, but how these activities are linked in a dynamic interactive manner that creates this value and competitive advantage. Product development processes, design for manufacture, corporate communications, packaging, transport livery, retail outlets, building architecture, interior design, signage and so on are all part of the design palette which can be integrated into a firm's activities – where they all converge to create, communicate and deliver value (Kotler and Rath 1984; Cato 1994; Weiss 2002). The effective management of design activities within a manufacturing business system can help to identify the critical areas where design can add value through its push for product and process innovation.

FIGURE 1: The traditional (above) and contemporary (below) models of value delivery.



Source: (Piirainen 2001)

In **Figure 1** above, the traditional model of value delivery starts with making the product and ends with selling the product. This chain of activities does not consider how the market will perceive the value of the products or services offered by the firm. The contemporary model however, is predicated on a user-based strategy by applying a holistic view of how value is delivered in downstream as well as in upstream activities.

Design can certainly be a valuable player, acting as an integrator to link and regulate diverse organisational processes (Treuman and Jobber 1998; Piirainen 2001; Reinmoeller 2002; Weiss 2002).

Lorenz (1994) claims that one of the main issues that leads to the value of design being underestimated is that, *"Academics and consultants have failed to develop a powerful typology of the various constituents of design – equivalent of marketing's four P's".* Trueman and Jobber (1998), add to this view in saying,

> *"Hard pressed companies will only take design seriously if they can see a tangible benefit showing precisely how design is associated with the development of successful innovation and improved company performance."*

Through their research, Trueman and Jobber (1998) have identified several key levels – product, process, production and strategic levels – where design can influence the process in the development of new innovative products. Their findings were built upon a previously conducted survey of 108 British companies and their responses to questions based on performance indicators such as percentage of sale growth, return on capital invested, performance in comparison to competitors and time to market. They have subsequently proposed a VIPP (value, image, process and production) framework (Table 1) that suggests how design can play a role within these broadly defined dimensions. In their findings they also explain that the significance of each dimension can vary according to the differing nature of firms being investigated.

TABLE 1: VIPP framework, the roles design can play in effective new product development

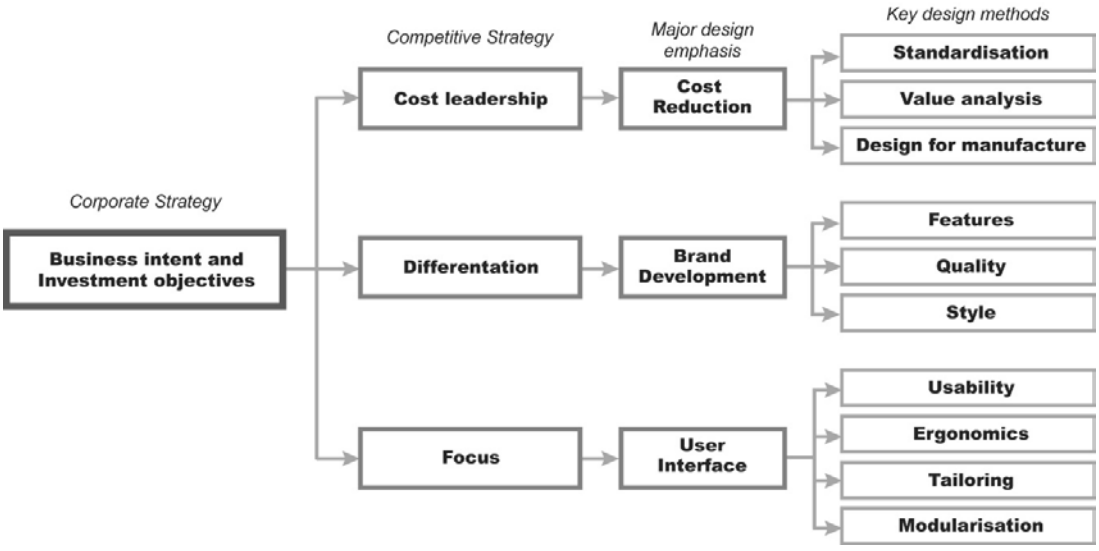
Design Dimensions in New Product Development	Design Attributes	Design Performance Measures
VALUE (A concept that relates to the fundamental goal of companies in developing high quality products that meet customer needs)	• Perceived added value and product quality and identity (product differentiation and visual perception) • Standards • Meeting customer high level expectations (conveys reliability and value for money) • Quality of the built and natural environment	• Perceived and actual product value • Profit margins • Product retail price
IMAGE (Follows the notion of perceived value that is often in relation to aesthetics, appearance, style and identity)	• Product image • Company image and identity • Branding and promotion	• Perceived company profile • Brand equity
PROCESS (Identified as the least utilised and understood dimension – as it is intangible and involved in the acquisition and management of 'soft' information, there is also difficulty in showing how processes relate to performance)	• New product development through idea generation, review and interpretation • Integration, communication, liaison and teamwork, where designers can act as integrators • Focuses on any stage of the	• Number of products developed and launched • Time to market, • Market share • Sales growth

	product life cycle • Company culture and management of change associated with innovation	
PRODUCTION (New technology, and management tools can include knowledge-based systems, CAD, IT – which can help reduce risk and uncertainty with well managed information)	• Speed and efficiency • Cost cutting in production (reducing number of parts and materials) • Reducing time to market (effective use of technology and production practices) • Redesign (updating of products, green design, recyclability) • Closer links with customers, suppliers and distributors	• Production speed, efficiency, use of materials and costs

. Source: Adapted from Treuman and Jobber 1998.

By applying Porter's three generic strategies Piirainen (2001) shows how a firm can further extract the benefits of design and apply it to the product development process, relative to the choice of corporate strategy (Figure 2). Porter (1980) describes how a firm must choose between these competitive strategies in order to thrive in any given industry – cost leadership, differentiation and focus. Pursuing any one of the three generic strategies requires the firm to make trade-offs between operational concerns and integrate key activities along the value chain in a superior way. The challenge for the firm is to choose the appropriate strategy at the right time.

FIGURE 2: The application of Porter's generic corporate strategies can define the key design methods that are most important for a given project.



Source:(Piirainen 2001)

Firms engaging in **cost leadership** aim to be the lowest cost producer in the market, searching for economies of scale and the benefits of the experience curve – thereby pursuing a design approach that optimises the use of manufacturing equipment and

materials. A **differentiation** approach involves the firm offering a product that is distinctive to those of its competitors, often distinguishing its products by communicating excellence through branding and product styling. A **focus** route points to serving the particular needs of a niche market that involves customisation and user-centric design objectives (Porter 1980; Piirainen 2001).

Design, the Invisible Resource

> *"**'Finland beats Sweden 10–0'** read a recent headline in a Swedish newspaper. It wasn't ice hockey, but the design of Finnish Nokia and Swedish Ericsson cell phones! In all the Nordic countries, both government and the business sector have begun to realise the potential of design as a competitive edge. But the fact remains that in small and middle-sized companies, designers are still absent." (Raatikainen 2000)*

In order to survive in a volatile market environment amid constant change and competitive pressures, small businesses must be able move more swiftly than their larger counterparts. SME must therefore find ways to create value in order to capture value through innovation and design. They must build a sustainable momentum for market introductions and offer more customised products in order to stay ahead during these uncertain times. However, many small firms still lack in awareness of the commercial impact that design investment can have on their businesses. Why is design still an undervalued resource in SME?

The value of design is often underrated as a business resource because it noticeably lacks a managerial framework that can translate and support its value in economic terms (Roy and Potter 1993; Treuman and Jobber 1998, Calonius 2002). SME are constantly faced with a shortage of resources such as time and capital, however, research has shown that the use of design by smaller firms can contribute positively to business performance by increasing product value, by improving the perception of the firm and its brand, by contributing to the manufacturing process in reducing costs and saving time.

In offering customers more innovative and distinctive products, manufacturers can also charge a premium price in selected markets – ultimately contributing to the profitability of the firm in the long run (Roy and Potter 1990; Treuman and Jobber 1998; Piirainen 2001). The main issues that have affected the ability of SME in effectively using and investing in design are discussed below (Cato 1994; Mazzarol 1994; Roy et al. 1997; Bruce et al. 1999; Piirainen 2001):

Organisational Structure

SME that are owner-managed tend to be run with a management style that has a tendency to become over reliant on the skills and experience of one individual. If they lack awareness, or do not have the time or skills to appreciate the value of design integration, the capability to develop it as a strategic resource may not occur.

Lack of Design Management Experience

Buying design demands insight, discernment and knowledge of the design process and profession. After selecting the right designer to employ, the firm still requires effective methods of briefing and evaluating design. A manager has to know how to select a design

company that is best suited to needs – this sense of judgment and empathy is often found lacking in the SME.

Short Sightedness

Design is usually implemented with a "quick fix" mentality. This may lead to design being integrated late in the manufacturing process – such as downstream activities like product styling, where its impact may be transient and minimal. The lack of awareness of design's potential commercial returns can be a major barrier to this investment. Many firms view their projects as one-off investments rather than as a way of incorporating design into their long-term strategy.

Lack of Senior Management Commitment to Design

Without the voice of a champion to lead the design initiative, design projects do not get the credibility and attention needed to be properly integrated. This may lead to insufficient allocation of funds to cover cost and add to the indifference towards design and its capacity to enhance performance and competitiveness that can eventually contribute to the bottom line.

Design is frequently outsourced and therefore designers and their services are regarded as a client-supplier relationship, seldom as an integrated resource. There is a proliferation of "silent design" where the activity is frequently undertaken in an ad hoc way, where most of the people in the firm making decisions about this resource have no design background. Firms that have little or no exposure to using design tend to be apprehensive and apathetic in their investment of it.

In more general terms, there is the issue of designers and manufacturers not being able to share a common language (Rand 1993; Treuman and Jobber 1998). The polarities that exist between manufacturer and designer communities are embodied in terms of semantics (language), context (industry, environment, mindset and knowledge) and processes (skills, tools and equipment, work practices). These intrinsic and extrinsic motives are all further reinforced by the culture that is inherent in their particular industry.

To convey this point, Rand (1993) quoted the example of Michaelangelo,

> *"…responding to the demands of Pope Julius II about the completion of the Sistine Ceiling, replied, "It will be finished when I shall have satisfied myself in the matter of art." "But it is our pleasure," retorted the Pope, "That you should satisfy us in our desire to have it done quickly." And it was not until he was threatened with being thrown from the scaffolding that Michaelangelo agreed to be more expeditious. On the whole, however, the relationship between Michaelangelo and the Pope was reciprocal. Mutual respect, apologies and ducats were the means of mediation."*

Rand used this example to illustrate that contemporary relationships between designers and non-designers still fundamentally differ in their attitudes towards design – he adds that, "The value judgements are often at odds…(they) have their sights set on different goals." For the designer, design is a means to invent, experiment and unleash creativity; on the other hand, for the entrepreneur, design is a means to achieve economic, political, or social ends. Furthermore, according to Kotler and Rath (1984),

> *"They (executives) are trained…to be numbers-oriented, to minimize risks, and to use analytical detached plans – not insights gained from hands-on*

> *experience. They are devoted to short-term returns and cost reduction, rather than developing long-term technological competitiveness. They prefer servicing existing markets rather than taking risks and developing new ones."*

Although Kotler and Rath are not directly referring to the attitudes of manufacturers, the short sightedness of many small business owners who are mired by their resource constraints and locked into the routines of their day-to-day operations has been supported by the literature reviewed (Roy and Potter 1993; Bruce et al. 1995).

To guarantee that innovation actually happens; design must permeate throughout a business using a holistic design management approach, rather than be left in the hands of specialists. In this way, design becomes a core business process that relates closely to all the other manufacturing functions in a firm (Kotler and Rath 1984; Walsh et al. 1988; Treuman and Jobber 1998; Weiss 2002).

Best Practice for Design Success

The literature has identified the major distinguishing characteristics of firms who have developed superior competence in using design strategically. Below is a list derived from the various articles reviewed from product development, design and business management sources (Walsh et al. 1988; Peters 1989; Roy and Potter 1990; Crawford 1991; Bruce et al. 1995; The Australian Academy of Design 1995; Large 2001; Meurer 2001; Bertola and Texeira 2002; Reinmoeller 2002; Weiss 2002).

Entrepreneurial Leadership and Top Management Commitment

Clear and consistent leadership qualities are critical for achieving the fusion between vision and reality. Leaders can create the urgency for change and stimulate knowledge processes and innovation by communicating competitive reality, values, vision or strategic intent. Leaders must be able to articulate a consistent corporate culture where managers clearly communicate their plans, focusing on learning and training requirements and demonstrate the importance of full participation in design activities. Commitment from the top ranks will often ensure adequate resources and responsibility that is assigned to the right people and to the appropriate projects.

Clear Project Objectives and Comprehensive Design Briefs

One of the principal stages in product development involves the brief from management to designers and development personnel. After careful selection of appropriate design expertise, the preparation of a comprehensive design brief is a crucial step before proceeding with the project. Evidence supports that a 'best practice' brief must include a detailed understanding of target market segmentation and orientation; guidance on appearance, image and style; compatibility with existing products; information on relevant standards and legislation; pricing and product specifications; business processes (strategy, marketing, promotion and finances); accompanied by explicit time and cost constraints. An effective design brief contributes to defining a structure that will assist in bringing clarity and focus to communications and minimise wasted effort during the development process.

People and Relationships

Innovation and design are inherently social processes and networked activities, where a collective front of interdisciplinary individuals, come together in a complex system of knowledge exchange and coordination. Being smaller in scale, SME can benefit from the relations between participants in their close-knit business network. People present the key asset for the integration of design that brings together the knowledge and experiences of all actors who interact with the firm. For SME to remain competitive and to continuously innovate – harnessing the power of a shared vision for action with all stakeholders is a critical strategic process.

A firm's design policy should be communicated to all levels of the network. These interactions include regular communication and strong linkages with customers, suppliers and partners that bring closeness and strength to the relationship and removes barriers to communication. Cooperation with external suppliers, distributors and retailers, can help reduce transaction costs, leaving more room to improve performance and maintain higher levels of quality. Shared contexts and teamwork promotes joint problem solving and access to complementary knowledge and skills. For example the establishment of routines for interactions with external design consultants can develop into a variety of learning effects in a self-reinforcing system such as:

- changes in attitude towards design where the awareness of the commercial importance of professional design is realised;
- changes in the resources allocated to design with the integration of designers early in development work, the benefits realised of employing an in-house designer and the frequent use of cross-functional teamwork; and
- regular contact with designers during the project allows participants to acquire important skills for effective design management that includes choosing the appropriate consultant as well as the recognition of the value of a clear and detailed brief

Processes

It has been found that commercially successful product development projects paid more attention to genuine product improvements and used a multidimensional approach to design rather than just focusing on styling or costs. Design is an integrative process and to be used competently and competitively, it has to coincide with other disciplines and processes – such as research and development, marketing, finance and cost management. Communication between people and departments is as important as problem solving and its success depends on the added combination of knowledge at all levels of the firm.

Processes such as prototype evaluation, user feedback mechanisms can often lead to ideas for product improvements. Effective product planning and design requires the intimate knowledge and understanding of user needs. It has been found that commercially successful firms were proficient in gathering market intelligence from several sources that included trade shows and exhibitions; customer feedback enquiries; service reports; market surveys; technical trade literature; competitor analysis; multidisciplinary workshops involving internal and external specialists and so on.

Technology

Technology can assist in creating routines and systems that aid and provides consistency to the design process. Although technology cannot replace the richness of face-to-face interactions, tools such as digital visualisation methods, project and knowledge

management software can systematically capture, synthesise and analyse the information and diffuse it throughout the firm and network partners.

According to Spence (1995), innovation can occur in products, processes and practices. The real challenge is to identify and leverage organisational resources that will prime the way for innovation to occur. From the best practices considered before, we can broadly define what Weiss (2002) terms 'the innovation engine'– which suggests that innovation occurs in three critical areas of an organisation (Figure 3) – in human, business and technological dimensions. She asserts that these,

> *"Interdisciplinary factors fuel the innovation engine that powers early-stage innovation in an equitable and mutually inspirational way."*

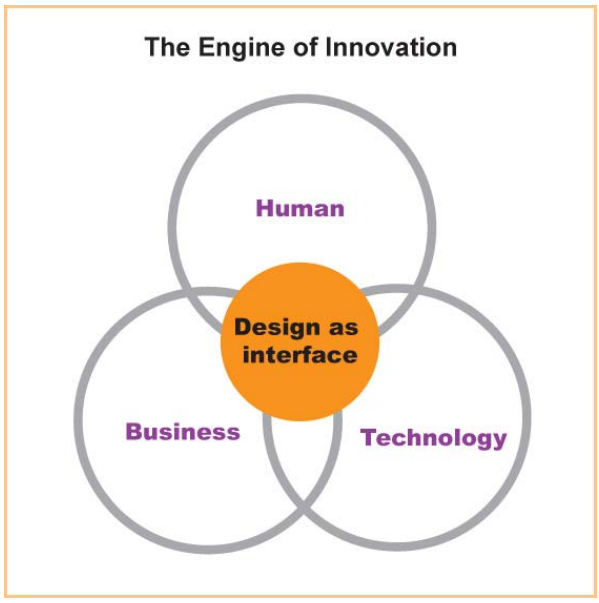


FIGURE3: The innovation engine by Weiss' (2002) – where design acts as the interface between human, business and technological factors.

Weiss expands this innovation model to include design at the intersection between these factors acting as a "bridge" and an "interface" to close the gap between designer-client relationships and processes. She emphasises that only by leveraging the expertise in these connected fields, can there be progress towards successful collaboration and alignment towards developing a strategic design vision.

Is knowledge the missing link?

Before the implementation of "best practices" can be successful, the manufacturer should veer away from conventional wisdom of ingrained perceptions and practices in order to embrace design as a key strategic tool. Much of design knowledge remains tacit and is not easily articulated with written documentation or manuals. The key hurdle and barrier to design usage can be related to the perception and entrenched practices that firms reinforce through their existing culture and processes.

> *"You can't change an organisation fundamentally from the outside and certainly not by putting up boards of pretty visuals as a means of showing*

> *how design can make a contribution. You have to get inside and change the way things are looked at; this often means having to reform the decision-making processes that impinge on design…"*
>
> *(John McConnell, partner in Pentagram, a global multidisciplinary design practice)*

We can further derive from the evidence of best practices, that the common link between all interactions is the **knowledge** that resides in these routines (Reinmoeller 2002). Design knowledge can therefore act as the key driver and integrator in developing strategic design and innovation (Bertola and Texeira 2002; Weiss 2002). The literature suggests that an effective working relationship between manufacturers and designers involves managing learning and knowledge through processes that communicate and support the value of design.

Knowledge can be reinforced by building communities of practice through shared mental models and exposure to long-term collaboration (Roy et al. 1997; Bertola and Texeira 2002; Reinmoeller 2002). The attitudes and values which most people hold in relation to anything new and different tend to be affected by their past experiences (Spence 1995). Therefore, in order to integrate effective design practices, the firm must 'unlearn' in order to 'learn' so that change in behaviour and attitudes can prime the environment for innovation to occur (Argyris and Schon 1978, Miller and Morris 1999).

Argyris and Schon (1978) have identified two different types of organisational learning – single loop and double loop learning. Single loop learning occurs when flaws are detected and resolved, but the guiding principles, goals and the underlying mental models of the organisation lay unaffected. Single loop learning does not examine the deep-seated beliefs underlying the existing ways of thinking and working. **Double loop learning** however addresses why the flaws occurred and how the existing culture, policies and objectives of the firm may have contributed to the deficiencies in the first place.

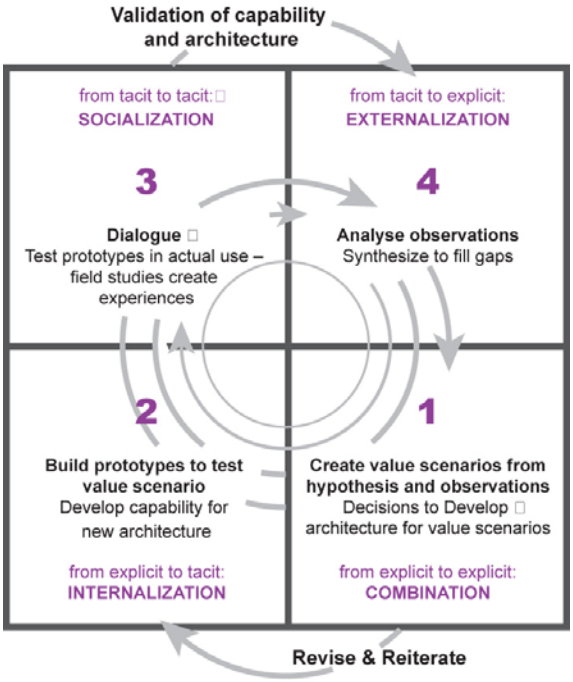


FIGURE 4: Knowledge conversion creates a spiral of knowledge through using the SECI process. Source: (Nonaka and Takeuchi 1995; Miller and Morris 1999)

Manufacturers need dynamic knowledge processes to share and absorb the knowledge generated through these complex interactions. The SECI model **(Figure 4)** proposed by Nonaka and Takeuchi (1995) shows the 'spiral' of knowledge conversion as the core capability for a firm that leads to superior innovative practices.

The model shows that in order to extend the perception of changing environments – creating explicit value scenarios that pursue best practices and benchmarking (combination); this can be disseminated through learning from processes such as building prototypes and insights gained from past performance (internalisation). Knowledge processes such as sharing emotions and mental models through experimentation and regular interactions between manufacturers and designers (socialisation) – leads to more explicit synthesis and analysis of these activities in order to refine and validate observations towards further idea generation (externalisation). This spiralling process of knowledge creation and diffusion is a continuous iterative process. Its ongoing viability is determined by the effective multilateral integration of design and management policies.

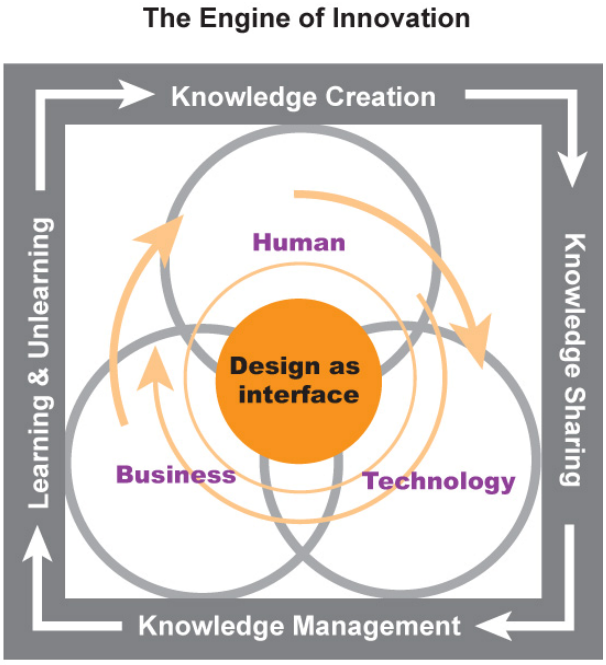


FIGURE 5: Combining Weiss' model of the engine of innovation and the SECI model.

By incorporating the 'spiral of knowledge creation' to Weiss' model of the 'engine of innovation' leads to a more complete picture in understanding the dynamic and complex interaction between design knowledge and key organisational factors (Figure 5). An effective innovation mindset requires the collective skills, creativity, insights and values of many. Design knowledge as interface can help link these important facets by enriching communication strategies with company stakeholders and collaborators, prompted in an environment characterised by an open sharing culture. These interactions can assist in

new product development, in improving design features through the use of new and innovative fabrication techniques and the realisation of the benefits that design can bring to the table.

Conclusion

Michel Foucault once stated that, *"Design becomes powerful only when it enters the domain of other discourses."* (Lupton and Miller 1996). Within small and medium-sized companies the power of design is still underrated as a critical business resource. Changing the general attitude towards design is foremost a battle of perceptions and a crusade against ambivalence. To bridge this gap, issues on culture, learning and unlearning and the creation and sharing of knowledge have to be addressed before effective design-use can be implemented.

"Change and barriers to it (design) exist in the minds of people, rather than in processes." (Mok 1996). The holistic integration of design in the manufacturing processes will require compromise from both manufacturer and designer. The manufacturer and designer should learn how to integrate processes and be prepared to meet in the middle in order to work towards a common goal for mutual benefit. To work together and complete tasks within certain constraints they will need a structure. Collaboration is an act of working within that structure in order to create an organisation where there is a spiralling process of interaction between explicit and tacit knowledge. As knowledge is not a physical entity – it is embodied in the individuals that work within and outside the framework of the firm. The firm therefore, has to find ways to make the knowledge accessible and useful to all in the company. The firm and its actors must learn how they learn, and in some cases "unlearn" with the intention of breaking away from the "dominant logic" that was successful in the past, so as to generate new ideas and renew organisational vigour (Nonaka and Takeuchi 1995).

The transformation between old ways of working towards the new, will generate a tenuous evolution but will also bring forth rewards and wisdom for those who are willing to be flexible and adaptable to an ever changing and demanding environment (Miller and Morris, 1999).

SECTION 3

Case Study Descriptions

The descriptions of the eight case studies completed for this research are presented in this section. The case studies are listed and described following an alphabetical order. Please refer to **Appendix 1** for a list of data sources used for reporting.

Table 2: Case study participants

Company	Interviewee	Position in Company
Albany Engineering Company	Mr Peter Bassett	Owner/Proprietor
AQ2	Mr Chris Speight Mr Steve Brown Ms Maureen Mawson	Technical Director Chief Executive Officer Marketing and Promotions
Coastal Stainless	Mr John Embleton	Owner/Proprietor
Finewood and Landscape Design	Mr Bruce Thomas	Owner/Proprietor
Mt Romance Australia	Mr Stephen Birkbeck Ms Louise Burgler Mr Jerome Ryan Mr Roland Butcher	Managing Director Product Development Manager Marketing Manager (bulk oil division) Director (Chemistry Design)
Smith's Aluminium	Mr Jim Cann	Owner/Proprietor
South Coast Fabrications	Mr Neil O'Keefe	Foreman
South Coast Wood Works Gallery	Mr Dean Malcolm	Owner/Proprietor
Wilson Machinery	Mr Gary Wilson	Owner/Proprietor

The case studies are structured around three main themes:

- The background of the company and the key people who manage the design processes in the firm – with a brief overview of products and services offered
- The role design plays in the firm relative to what design means for key decision makers who drive product development processes; their opinions and attitudes towards using external professional designers is also canvassed as well as learning and collaborative behaviour
- An overview of a typical product development process is presented to illustrate how design currently is applied within the firm's products and processes. It examines activities such as communication and approach to problem solving

CASE 1 | Albany Engineering Company

Background

Albany Engineering Company is located at the outskirts of Albany and is involved in the design, manufacture and repair of agricultural and industrial machinery. The company's owner and proprietor, Peter Bassett, is a fitter machinist by trade and bought this business more than eight years ago at the age of 27. Its customer base comprises 30% to 40% farmers; 25% mine sites; 20% grain handling and 15% others (eg. vineyards and marine clientele) respectively. The company's market spans the Great Southern region and other regional areas in the State such as Northam and Esperance.

Although Peter has his hands full with business and customer service concerns, he is also closely involved in the design and manufacturing process. He sees himself as the "glue" that holds things together in the company, especially when it comes to facilitating relationships and communication among staff and customers. Peter likes the mechanical part of the work, fixing equipment, "getting his hands dirty" and to problem solving. Peter explains that his business is not easily saleable because the potential owner would need the extensive experience, knowledge and client relationships that is difficult to transfer. Running the enterprise requires a hands-on approach, where it is highly dependent on the proprietor and the nature of highly customised projects does not allow for long-term planning and growth.

With advice from the Great Southern Development Commission and the Great Southern Engineering Group (GSEnG), he hopes that in the future he must make his position more replicable and less complicated – where anyone can take over the business and make it operational. He realises that the company requires the services of an office administrator to streamline business processes as well as implement best practices to elevate organisational standards and bring greater consistency to the business.

The Role of Design

According to Peter, design to the company means manufacturing design, when one works out how to fabricate a piece of machinery by means of sketches and pictures understandable by an average tradesman. The role of design is viewed as "part of a chain" of events leading up to manufacturing the final product. The evaluation of their products comes from benchmarking its manufacturing processes against a competitor's ideas or plans, by feedback from clients and potential clients and through past experiences with failures and successes. There are only two direct competitors in the region that do exactly what they do.

In aspects of corporate identity and communications the company's exposure to design services have been limited to company stationery (letterhead and business card) – that was carried out by a local printer; and the signage for the front of the building, organised by a "friend of a friend". Peter did not feel a sense of involvement in the process, as the activities were not within the realm of his responsibilities.

When asked about the possibility of working with professional industrial designers, Peter says it will be an "ideal situation" for him and the company. In the future, he considers being more involved with architectural design and sign-writers. His past experience with innovators has led him to believe that, "They have got the brains but not the capital." The idea to co-invest and commercialise has been thought of, but left unrealised. He also says that most innovators do not have ambitions to manufacture in any great volume, or

there is really nothing too distinctive about their ideas to warrant commercialisation. The constraint of volume and limited budgets makes it difficult in making things cost effective for them and customers alike. Peter is always interested in assisting someone to come up with a prototype and help solve problems if approached with a good idea that he can get excited about.

Product Development Process

Peter's primary role is to be an advisor to customers as well as to "nut" out the design and manufacture of the machinery. A customer often comes in with a problem to solve (eg. to fix faulty machinery) or a request to design specific equipment for a particular need. After defining the design approach the problem solving process begins – it is vital from Peter's perspective to get things right from the beginning in order to save time and complications later. The critical success factor that drives this process is the communication with customers – about, "What they want and when they want it." The company often works with tight schedules as most customers rely on their equipment to make a living.

Customers sometimes brief him verbally, with sketches, or larger companies supply him with more elaborate electronic drawings. Peter feels that detailed drawings can support more explicit communication with both staff and customers. As the company does not have internal expertise to carry out CAD-like drawings, they tend to outsource this process to design engineers in Albany – Wood and Grieve Engineers – to draw up specifications. One concern he does have is that the liability does not lie with the external designers but with his company, therefore all jobs are safeguarded by insurance and they always draw up something that is three times stronger ("overkill") than is actually required.

Peter elaborates that the "game of engineering" is a very involved process yet, his customers don't expect to pay for problem solving. Peter does not charge the design component to the customer as he considers it part of the service. He adds that, "The industry is plagued with people who don't want to pay for stuff…as they think that anyone could do the work." It seems to Peter that customers use him as a "think tank", one third of his time per week is spent on problem solving and consulting – on average, 50% of the design and manufacturing process is spent on refining designs and diagnostic work.

In the future, Peter feels he has to improve external and internal communication as well as to educate customers to the complex processes required to design and manufacture a product. Making the briefing sessions more explicit, by communicating the value of design and problem solving before proceeding with the project. Another would be to draw out the appropriate information from the customer to get a better brief, as getting a clear direction on the outset can facilitate better two-way communication. This process may help the customer understand where Peter and his team are coming from in terms of ideas. He says they have to be careful to "cross all the Ts and dot all the Is."

CASE 2 | AQ2

Background

Chris Speight is an engineering tradesman responsible for the invention of the Smartaflow Hypochlorinator system that is manufactured under the banner of AQ2. Being a young start-up company its product niche is targeted at the potable water disinfection market. The pump system delivers measured doses of chlorine into a water supply (Riley 2003). The trigger for the systems invention resulted from Chris' frustration with the weaknesses of existing pump technology (Sprague 2003). The design is aimed to be safer than regular gas chlorinating systems and it is the first known system that has managed to solve the problem of vapour lock in dosing pumps, which can subsequently reduce chlorine's effectiveness in disinfecting water supplies (Riley 2003).

Born in Manchester, UK, Chris has a background as an engineering tradesman who specialised in the design, installation and maintenance of water treatment equipment for rural water suppliers for over 25 years. His experience working at the Water Corporation gave him a firm grounding in the technical knowledge of the product and the manufacturing of some of the repairable components on equipment he serviced.

The pump project commenced with the approval for funding and support from AusIndustry's Commercialising Emerging Technologies (COMET) Program – a Commonwealth Government initiative in which they were involved in the year 2000. Chris describes the COMET process to be, "Excellent in allowing us to really take a look at how we have to do it in bite sized chunks." The process involved an immersive and rigorous exercise in market research; in completing a working prototype to prove that the technology would work; in finalising the design; in developing an intellectual property strategy and in developing a business plan.

Now in its third year of operation, Chris' role as technical director is to provide the company with an innovation strategy, providing the overall vision and momentum for the product development process as well as finding funding opportunities and generating sales. He and a team of internal and external specialists have been instrumental in expanding their product line for applications other than water disinfection. The Water Corporation has purchased five units of the system and the company anticipates reaching national and international markets in the near future (Sprague, 2003).

The Role of Design

Chris says that design can play an important part as a marketing tool, where the product has to "look" and "feel" right which, "Makes you fell proud to have achieved it." He adds that the design of the Smartaflow pump looks "radically different" from other comparable products in the market. Chris explains that,

> *"The initial design was developed from a viewpoint that there has to be something better than the existing designs, mainly due to the fact that they don't meet the needs of the operators - especially from an occupational safety and health point of view...I would have to say we primarily focused on best industry practices and consider that the design, quite radical from convention, will encourage the competition to rethink and possibly improve standards in the longer term."*

Through his past experience with corporate designers, Chris noticed that most of them were arrogant and not user-centric, by refusing to "look outside the box." He felt that they were irresponsible by not meeting user expectations and needs. Chris feels that design should be more focused on functionality and commercial relevance. When asked if design played a central role in the successful commercialisation process of the pump, he said that,

> *"Whilst I am not quite sure that design is the primary element, it certainly has to be a key element in the continual improvement of an engineering product - be it conceptual or existing."*

Chris believes that engineering design not only has to be a team effort for success, the product must also be marketable and profitable for the enterprise in the long run.

> *"So I believe that not only has engineering design got to be a team effort, to be successful, it must result in a commercially viable blueprint - a saleable item of some worth…Commercial reality bites! A continuing process of improvement for any engineering design is costly and, unlike an artist who merely rellies on his own ability to produce a successful work of art, an individual innovative engineer can seldom produce his masterpiece without a dependence on the ingenuity of others…Like it or not though, to feed the team and pay the banker, the design had to sell. "*

Product Development Process

Chris believes the design process requires foresight and planning, getting the details right and challenging perceptions. It's important to begin by looking at the "big picture." Chris says the development process usually starts with a set of rough sketches on a whiteboard where everyone in the development team is involved. Discussions based on the sketches, suggestions for options and the refinement of concepts follow in the development and alignment of ideas. Chris calls this the "affinity process" saying that this phase synchronises the thought processes of the team.

The second stage usually leads to a prototype being fabricated – where at least three working prototypes are tested before commercialisation. Archiving sketches, drawings and documents is essential to keep track of what has already been done, especially for problems that have previously been solved, saving time and serves as good reference to keep track of the development process. CAD drawing used to be considered a luxury, but the benefits of detailed drawings can be used to sell ideas, assist in the patenting process, it can act as a communication tool for manufacture and to develop a routine in the thinking process.

Chris says that access to good people has been important and it provided the "main energy" for the project. He adds that the product development process needed people who can accept and allow criticism. Chris says they are "a bit like artists", temperamental and usually difficult in business matters and lack the discipline in pushing towards commercialisation. Although social networks were the main driving force in the in the beginning of the product development process, Chris realised that professional designers were required to bring the product ready for commercialisation.

Chris realised from the beginning that good engineering design is not cheap but, "They worth their weight in gold when it comes to results." After some research he found that access to the expertise he needed was non-existent in Katanning or in Albany. It was in Perth that Chris had his first encounter with a professional engineering (mechanical)

designer named Dianne Boddy. Chris chanced upon Dianne when he happened to be involved in a group project with students from the Graduate School of Management at the University of Western Australia, who knew of Dianne's reputation and expertise as a leading engineering designer in her field. Convincing her to work on the pump design with him was not an easy task as she was very selective of projects she was willing to work on.

The primary function of Dianne was to create engineering drawings for the purpose of manufacturing prototype products. More importantly to Chris, she was sympathetic to inventors like himself. Furthermore, she made it possible for him to, "Access a network of specialist services – in Perth and elsewhere." Working with a professional designer has revealed to Chris, the importance of thinking about the manufacturing process at the design stage – as it ultimately saves time and decreases complexity and cost during manufacture.

At first, Chris found it difficult to cross the cultural divide between manufacturer and designer, but both had a need to work together. Their intense and long-term interaction helped in resolved the conflict that arose between them from time to time. One of the lessons learnt from this process that fascinated Chris, was that Dianne treated the exterior of the product "like a piece of furniture", concentrating on the proportions and aesthetics of a final design from an engineering perspective, that ultimately contributed to a product that was designed to be functional, yet satisfying aesthetically. Before this experience, Chris was looking at only achieving technical precision and functionality of the product and never really appreciated the role proportions played until his relationship with Dianne, commenting that, "She had the perfect eye for it. The final product looks and feels like a well engineered product."

From this initial experience with professional designers, Chris learnt how to facilitate an outcome with different personalities and ideas; he also understood that a systematic iteration of ideas by going back and forth and exploring options, makes design a synergistic process that should involve everyone from staff to manufacturers. The learning effects after dealing with Diane filtered through to the rest of the in-house product development team. The standard of design management and attitude towards design processes were raised. Now that they have developed a design team within the company they tend to use external designers less frequently. Chris remarks that, the transfer of knowledge and skills from their interaction with professional designers, was a critical change agent in contributing to the continuum of design processes and as well as creating the momentum for learning.

Chris can now leave his staff to go through the product development process without him. His current role is to manage and facilitate the development process by bringing together a diverse group of people that have the right attitude and expertise to do the job. Although in the beginning, he set out to be a key instigator in the process, it was unexpected for him that others have also evolved with the experience as well.

CASE 3 | Coastal Stainless

Background

Coastal Stainless in Albany is owned and managed by John Embleton. The company specialises in fabricating stainless steel tanks for the wine industry as well as taking on other customised work involving stainless steel, such as, marine and surgical equipment. John admits that he is "not the cheapest in town", but prides himself for offering the best. John has observed that, "Traditionally in Albany, service has been poor. The attitude generally was, if you don't like it, go to Perth to buy it." He admits that the company's margins are not as high as most other wine tank manufacturers, but their product and service are superior, and that is what "makes the difference." As a consequence he is noticing that more customers are coming directly to Coastal Stainless instead of going through the usual tendering process. The company's customer base not only stems from the Great Southern region, but also from other regional wineries in the State and around the nation.

After 4 years in operation, he has five young staff on his team – four specialising in stainless steel and one generalist with basic training. With the business continuing to grow, cash flows are improving in addition to the continuity in demand, and as a result, work processes and skills have also matured. For the 2002 vintage, they produced around fifty wine tanks, which is equivalent to one million litres capacity for the wine industry. Orders in 2003 have doubled last year's capacity and returns are expected to grow two-fold as well.

With his origins from Perth, John has embarked on a multitude of career paths that started with his training as a fitter machinist at BP Kwinana refinery when he was 15 years of age. At BP, he experienced precision work on turbines and had exposure to cutting edge technology and world's best practices. He adds that he was exposed early on to work processes which involved safety checks and world-class standards that have been ingrained in his work habits ever since. Moving between Perth and Albany, he has undertaken management roles at BP, Alcoa and Albany's South Coast Fabrications; a teaching position in trade studies; construction work; a maintenance position at a local meatworks; a music teacher; a fulltime musician and so on. John has also managed to obtain an associate degree in training and development in between vocations.

The Role of Design

John wrote this response when asked about what design means to him and the company:

> *"Design can mean designing a product to meet industry specific engineering standards or translating a client's ideas into reality. Industry engineering standards are generally of the tried and proven sort and often the only design consideration is to ensure that the equipment will fit in the allocated building space."*

John benchmarks his design practices by building on his past experience and "keeping an eye" on what his competitors and related parties are doing. He also says that when travelling his observations provide him with a great deal of ideas and keeps him current on design trends.

Apart from the Coastal Stainless logo that was commissioned to a local design company (that is no longer in business), John has been actively involved in the company's

corporate identity and has designed their workshop and front displays with help from his apprentice, Raphael, who has an industrial design degree. He is currently preparing for a field day in Margaret River that will include banners and product promotions.

John says he is always enthusiastic about being an active participant in the design process, as it is important that he feels a sense of ownership in helping to achieve the end result. John was asked whether he felt that outsourcing professional design services provided a value added experience – he recounts the experience as, "Feeling like I was being told something I already know." He remarks that graphic design services in Albany, are mainly provided by printing firms and most do not employ staff that have professional design qualifications.

> *" In Albany it is left to the person doing the layout to do the design work so once I am aware of the tools they have I like to become involved and this translates to me using them (engage in their services), their tools (software and equipment) and facilities, for me to get the result I need. Once I know what they can achieve with these tools I am able to contribute to the final design…Layout is prepared by them (printers) and the final layout is always checked by me before production"*

He relates that his background in business studies and especially, sound marketing knowledge has helped him appreciate the value of investing in design services. John adds that,

> *"I have a good feel for designs that work and I never hold back if I am paying for that service…I think that particularly in our business we look for a return from our advertising and design dollar." But he goes on to say that most businesses in Albany do not recognise design as a resource, remarking that, "It is the intangible things like design that people are not prepared to pay for, so design services in Albany are left wanting…"*

Product Design Process

According to John, the critical success factors that form the core their operations are their service and communication skills. These qualities allows for superior interaction at all levels between customers and suppliers. John has extensive industry knowledge and understands his customers' requirements and capabilities intimately, whether it is hose sizes, fitting or what they prefer in fermentor styles and so on. John remarks that, "The biggest challenge in design is to make something look like it has been bought in a shop." In terms of the briefing process, he elaborates that,

> *"Often clients have an idea of what they want and we assist them when it comes to ensuring that the finished product fits in with other contemporary designs – for example, hand rails and balustrades need to look minimalist and modern rather than industrial."*

John believes that well-organised systems must be in place for work to run smoothly – job cards, files and databases of clients and specifications are kept on the computer for efficient retrieval and archiving purposes. In the company database, a record of CAD drawings, correspondence, job costing, drawings and plans from external sources are all integral to the database system. John comments that keeping efficient records is also good for refreshing the memory and adds to the overall customer service focus of the business.

As for other staff involvement in the design process, John mentions that in the beginning, he used to solve problems for them constantly, but now they can make independent decisions about product designs as well as work as a team. All staff is encouraged to participate in the design process and all have a part to play in quality control. John adds that he has entrenched his stringent standards of quality and work ethics into the hearts and minds of his staff by leading by example.

Aspect of John's leadership can be traced back to his music background in a band, where he says everyone had to "leave our egos at the door" – therefore sharing and critiquing each other's work while being supportive is the norm – in John's words, "No one out there is a lone soldier." This participatory style of leadership has helped raise company performance, as his staff is challenged to improve standards and processes continuously. This drive for excellence has become ingrained in the company culture and helps his staff to feel a great deal of ownership and pride in their work.

Last year the company gained an apprentice who has a degree in industrial design from Curtin University. John notes that Raphael did not come with any government grant and is being paid a third year apprentice's wage, but his eye for detail, excellent CAD skills and knowledge was in John's opinion, "Worth the investment." He adds that his young apprentice consistently produces a good product; works faster on implementing design specifications and is "great with the customisation of certain features." Raphael also works closely with him to modify designs and they have developed some fittings and products together and John remarks that, "He would not have anyone else in this role."

The major benefit of having Raphael on board is his mature attitude towards work and his ability to tackle design issues with confidence. He has given John the opportunity to step back and concentrate on moving the business forward for growth. He can now focus on the "behind the scenes" activities such as invoicing, ordering, materials control, looking after the customer, costing and submitting tenders. John believes that when someone of Raphael's calibre comes on board, it helps other staff to raise their standards, as well as encouraging healthy competition and thinking out on the shopfloor. John also notes that his workshop foreman has remarkable "spatial aptitude", as he has the ability to look at a drawing or plan and visualise a three dimensional product. Although his foreman does not have any design training, his skills are outstanding regardless of formal qualifications – and these merits are also transferred to other staff members.

Networking and collaboration with customers and suppliers are important aspects of John's business. For example, through his involvement with Craft West's "Designing Futures" in August last year, John was introduced to Bruce Thomas, a local fine wood designer-maker. For the last six months, John has assisted Bruce in his design of a fine wood cabinet that combines the use of stainless steel components. During their meetings, they talk about the nature of stainless steel, about what is feasible and reasonable within a negotiated price of material and labour costs. John feels that it is important to support Bruce in realising his design, as he may "be the next big thing." He adds that, "It doesn't matter how small the client is, I have to look after them until it becomes economically unviable for the business."

CASE 4 | Finewood and Landscape Design

Background

Bruce Thomas the owner and proprietor of Finewood and Landscape Design is a landscape architect by trade and also a professional designer-maker in fine woodwork. He moved to Albany from Sydney with his German-born wife five years ago. Bruce and his family now live in the outskirts of Albany, with a dedicated professional workshop at the back of his home. In the beginning, Bruce started his business by investing his own capital and depended on word-of-mouth to attain commissions.

Since the early days, Bruce's reputation has grown, but he still relies on personal referrals for work as he still operates the workshop on his own and manages to get more than enough work for his one-man set up. His focus is in designing and making high quality unique functional and non-functional fine wood objects that includes – cabinets, tables, chairs and jewellery boxes. His market is mainly local, but interstate and overseas customers do find him through the range of works found in galleries around the State. He has also worked with local builders and architects in making bathroom fittings and doorframes.

Bruce has been a professional Landscape Architect for the past 20 years, which has given him a good foundation in design principles. He obtained his qualifications in Environmental Design and Landscape Architecture at the Canberra College of Advanced Education in 1980. He is a self-taught cabinet-maker, designing and making contemporary and traditional furniture – has been doing so for over a decade.

After moving to Albany, Bruce realised he needed to gain more knowledge and skills in fine woodcraft before becoming self-employed. He has so far completed the Certificates 3 and 4 in Fine Woodcraft at Great Southern Regional College of TAFE – which has since been discontinued. He points out that going to college gave him a good grounding in organising exhibitions, marketing and promotions. Furthermore, his involvement with the designXchange group has given him a platform to share, explore and hone his design knowledge and skills as well as further his self-development as a designer-maker.

The Role of Design

Bruce is "Inspired by the natural environment and interested in value adding towards the fine wood industry." and prefers, "Using timber from salvaged native trees locally sourced from the Great Southern region." Value adding to him means using a minimal amount of timber to create "light", yet "dynamic" furniture. When asked what design represented to him, Bruce explains that,

> *"Design is a personal thing, and you can't worry about what people think…just get the ideas out there. The craft side is more technically challenging, but is considered integral to the design process…while design is the bigger picture…In the beginning, it is important to keep designs simple, sticking to basic design principles. It is a dynamic process that involves (it would be boring if you just made things)…drawing from what is happening internally and externally and distilling influences for self-expression…"*

In all his creations Bruce aims, "To show the beauty of wood using thoughtful design to create a coherent and strong composition for the wood's characteristics to be displayed." In tandem with materials, he also enjoys the challenge of "making something work",

learning new techniques as well as posing and overcoming challenges for himself. With his high quality pieces aimed at the premium market, Bruce concentrates on designing for small volume production.

Bruce expresses that the design process brings clarity in life and expression, through that, a reflection of life experiences – past and present through his work. Bruce believes that designers are often taught wrongly to be "elitist" and tend to think they are better than others. Most designers spend much of their careers "searching for the holy-grail", and when they do not reach their lofty goals, designers often find themselves becoming "cranky and disillusioned." Bruce adds that it is important to be true to oneself, if not, it will show up in one's work. Moreover, he wants to be good at what he does and be recognised for it.

As a consequence – the judgement of peers is also important as well as the challenge and satisfaction of self-development, by constantly evolving one's attitude towards work. He recognises there is a problem in Australia in its support of "inventiveness", where innovation and intellectual pursuits face a lack of support. He feels that the recognition of good design is a problem.

Bruce is interested in the elevation of the image and promotion of design in the region. He believes that exhibitions are effective vehicles for promoting design and designer-makers in fine woodwork. In addition, he poses the questions of, "What is good craftsmanship?" and, "What constitutes breakthrough design?"

Bruce exhibits his work in galleries around the State – in places such the South Coast Wood Works Gallery between Denmark and Albany; Margaret River and Pemberton; Craftwest in Perth and Fremantle Arts Centre. He hasn't had a need for producing catalogues and brochures at this point in time as he does not target the tourism market. The company's business card is designed by Bruce using a computer layout program and is printed by Albany Stationery which specialises in printing business stationery.

Bruce feels that the regional development should focus on design, and not just in the promotion of raw materials. He comments that there was some frustration after Craft West's Designing Futures event last year, and that nothing was followed up after the event. He feels there is a need to have a workshop that can draw people together and to find out how everyone can work together.

Product Development Process

Bruce says that, "When you have been working with things for a long time, problem - solving becomes second nature…experience counts and is extremely important for product development and production." He has learnt to improve work methods by having hands-on experience, by trial and error and by knowing the materials he works with intimately. He adds that by investing time initially on getting the design right in the beginning and streamlining processes – he can save time and costs during the manufacturing process.

Bruce's father who was also an experienced woodworker said to him once, "Always think that this is the last piece of wood you've got for that particular piece, make it work…If something goes wrong, think of a way of getting around it." Bruce always makes sure that the tools and timber used are of the highest quality to begin with.

The design process usually begins with ideas and sketches to visualise a product. He often runs through the idea with the designXchange group, after which he moves onto refining his ideas, often putting much thought into how to make the design and product last through time and usage. Bruce then proceeds to make a model out of craft wood, which is a scaled-down, 3D representation of the initial idea. After fine-tuning with simplistic models, Bruce drills down into the details using fundamental design principles – searching for the right balance between form and function. If need be, he will move on to more comprehensive prototypes that help to demonstrate how the different design elements fit together before manufacture.

Bruce approaches the practice of manufacturing as a rhythmic and systematic process. He believes at this stage one stops being the designer in order to become the maker, taking on the role of a planner. He spends an inordinate amount of time – about a day – just selecting and matching timber that he later cuts into lengths (machining). Bruce says this is an important step to get the design right and to work out the quality of timber that complements that design. He will add any required joinery and customised carvings in between the process.

Bruce always makes sure he is constantly checking, especially when he is working out the bill of materials. Some of his tools include German drawing slides, production templates, organic oils and brasso to give a finer finish. Jigs are used for manufacture, as it is the only way of making something quickly and repetitively – jigs usually take 20 minutes to set up. He notes that jigs are also useful, “If one comes back after a month and can remember what to do, as it is easy to forget.” Bruce believes that it is critical to get the first step right – for example marking out measurements, proportions and joinery – so that ten steps later, “Something doesn’t come back to bite you.”

He thinks that a designer-maker has to be able to speak the language of both designer and manufacturer to be a consummate professional. He comments that making fine furniture is different from making general furniture – he says, “You have to love every bit of it, from design to making and finishing.” Bruce is adamant that the product and process should be high quality at all levels, as it is important in maintaining a reputation for quality and superior craftsmanship. Bruce adds that he is not “cheap”, but his furniture is “going to last a hundred years or more”.

On the issue of collaborating with other manufacturers, Bruce mentions he would like to know more about what would be involved in terms of volume manufacturing, how to draw the components in for assemblage, the different materials needed and the priorities of those manufacturers. From experience, he remarks that manufacturers usually recognise the value of the designed product but not acknowledge the designer. In his view, designers usually want control over the integrity of his or her design and would also prefer a commercial profile – which may include a combination of marketing, market research and branding.

Bruce feels there is a need to get manufacturers to understand how designers think. Not the “What’s in it for me?” attitude he has experienced. It is important for Bruce to retain a high quality to the finishing for his pieces, but worries that when going to manufacture there may be certain compromises made because of price constraints. He suggests that there should be some measure of quality assurance and quality control involved in the process. Other issues concerning ownership of the design and intellectual property are of ongoing concern for him as well.

Bruce has recently worked collaboratively with John Embleton from Coastal Stainless whom he was introduced to by a fellow designer-maker after Craftwest's Designing Futures event. John consults Bruce on stainless steel rods and joineries that he wants to incorporate into a cabinet design. The design process involved an initial shop drawing of the design at Bruce's workshop. Soon after, they discussed adjustments and component costs for stainless steel parts, working out refinements as they went along. They are currently working on a small prototype.

CASE 5 | Mt Romance Australia

Background

Mt Romance Australia Pty Ltd (MRA) is currently the world's largest supplier of Australian sandalwood oil, distilled from an indigenous Western Australian species of sandalwood known as *santalum spicatum*. The company exports pure Australian sandalwood oil to Europe, Asia and the United States from it headquarters in Albany, a regional town centre situated in the south west of Western Australia. The company also operates the world's largest sandalwood product factory processing up to 400 tonnes of wood in 2001/02 alone, and currently employs 48 staff from the region. MRA's extensive activities range from the research, development and supply of Australian sandalwood oil in a variety of grades and by-products, to the wholesale and retail sales of its own brand of products such as the Santalia range and emu oil-based cosmetics and therapeutics.

Karen and Stephen Birkbeck are the founding partners of MRA, and have been foremost the pioneers of emu farming in the early 1980s, a venture that brought them into close contact with inland Aboriginal communities and their ancient practice of using emu oil for therapeutic purposes. The unsuccessful emu farming government-assisted program ceased in 1983, but the couple learnt from this experience, that prices in trading emu meat and oil were low and making a profit was negligible compared to possible value adding activities that would exploit the virtues of a raw material.

MRA started from modest beginnings, when the Birkbeck's spent countless nights in a home kitchen creating emu oil products to be sold at local markets. Through countless experimentations with formulations, the Birkbecks developed a range of emu oil cosmetics and therapeutics that was based on a unique blend of indigenous compounds. Both husband and wife were actively involved in the running of their business, which brought them through a steep learning curve of experiences in manufacturing, packaging and marketing their emu oil-based products.

Western Australia has the world's largest and best remaining source of sandalwood, and even though sandalwood in the form of logs and woodchips was one of the largest exports for the State to the Far East in the 19th century, the industry has laid dormant since the 1970s. In 1996, and after many years of success in exporting emu oil products and with demand outstripping supply in the market, the Birkbecks needed to find a new home and helping hands for their rapidly growing enterprise. The opportunity presented itself when they heard of a failing essential oils factory in Albany and soon after they made the offer to purchase the state-of-the-art facility. Around the same time, the Birkbecks also sensed that continuing long-term business success in the competitive and lucrative market of emu oil products would be difficult without diversifying into other compounds as the business grew.

In view of this, Stephen looked towards essential oils to expand their business. Through their own investigations and the commissioning of Austrade to perform rigorous market research and analysis in Europe and Asia, an opportunity was identified in pure Australian sandalwood oil, a substance that they assessed as a sustainable resource with a global demand that would provide the business with long-term competitive advantage. Over the last four years annual sales from exports have grown at an exceptional rate, where annual turnover in 1999/2001 reached $2.5 million, increasing to $4.5 million in 2000/01 and surging to $7 million in 2001/02. With profits amounting to $500,000 last financial year after a loss of $200,000 in 2000/01, revenue in 2003 is predicted to rise to around $9 million. Sandalwood oil export for MRA was around 4,000 Kg of oil in

2001/02 and is expected to more than double to 10,000 Kg in 2002/03. The key factors that form the customer's decision-making process are product quality, price stability and supply capacity. The MRA's vision is,

> *"To become the world leader in the production and marketing of sandalwood oil through establishing an international reputation based on reliability and quality."*

Given this growth, Stephen Birkbeck, managing director of MRA says,

> *"What is truly visionary is the background to these sales and the implications for future contracts and research of intellectual property, is that it will provide a blue print to our nation's leaders on how to succeed when faced with the tyranny of distance, isolation and a small unskilled regional workforce."*

The Role of Design

Retail and tourism activities at MRA revolve around its commercial focus of selling bulk sandalwood oil. These different facets of the business require different but synchronised design and marketing strategies that act in concert to promote and complement their core business of marketing and exporting Australian sandalwood oil to the world. The company recognises that in order to create a desired perception in the customer's mind of the quality and value of Australian sandalwood oil, the company must also look and act the part. MRA's corporate image is reflected through its products, communications, staff and environments – where design manifests itself from the logo, corporate stationery, packaging, marketing literature, staff dress codes, to buildings, signage and landscaping – in which they endeavour to convey a consistent message of professionalism and quality. Stated in the WA Design Award document, the management of MRA says that,

> *"We are entering into an arena in which a launch budget for a new perfume could be as high as $20 million Australian dollars. As a result, our standards of design must equal those established by Parisian perfume companies. These standards encompass not only manufacturing and design, but extend to the perception of our manufacturing and design. Hence, from the tourist's perspective, even in the selection of our plant and equipment, an eye for visual impact must be considered."*

Stephen Birkbeck, as Managing Director of MRA is the primary advocate and visionary for the company's design and marketing strategy. As an entrepreneurial leader, Stephen is recognised for his passionate and intense involvement in creating a total Mt Romance experience that starts and ends with the customer in mind. In 1998, Stephen and Turner Butcher, a design firm in Perth collaborated in developing its design that led to the three key elements of 'spirituality, sensuality and vitality', echoing the application of sandalwood based on ancient beliefs about its mystical properties. According to the company the designers helped to formulate a strategic marketing vision for the Santalia range beyond its superficial packaging,

MRA uses local design production expertise such as graphic designers and internal marketing expertise to generate a continuum of design solutions that support their core design thrust of promoting Australian sandalwood oil. Over the years, designers and printers are selected based a good working relationship and the established trust and confidence in their ability to deliver a consistently superior product. It is imperative that they communicate well and keep each other in the "loop." Local printers have been

working with Mt Romance since the beginning, with understanding of materials and level of quality that MRA requires of production. They use professional designers in Perth, such as Turner Butcher to develop the overall look and feel of products and presentation and from there they usually draw on more accessible regional expertise to expand on the design concept.

Product Development Process

As the coordinator of product development in the company, Louise Burgler says that product development, whether new or existing, is a response to a combination factors such as,

> *"What is the market asking for, what will best promote our product and support the cause of our core business (sandalwood oil) and perhaps most importantly, in a very competitive market, where do we have an edge and what can we do best?*
>
> *Once these issues have been identified and answered then we know what we need to develop. When a demand exists and we can identify that we have in terms of the strengths necessary to meet that demand, then product development can progress."*

Louise points out that a "visionary" sometimes drives product development, where someone or a team of people would identify new opportunities that did not previously exist. In the case of 'The Cone, the Gong and the Bowl', the concept originated from Stephen who has had experience with meditation practices for over 20 years. Regardless of who initiates the idea, each phase entails thoughtful planning and analysis, quality reviews while adhering to industry standards and clearly defined parameters and markets have to be identified before the proposal proceeds into development.

The sense of ownership and shared accountability of the process and end product is evident through the value they put on the input of various stakeholder groups such as their customers; staff; sales agents and retail representatives; designers and printers; shareholders and the community at large. Their contributions are valued and viewed by the company as critical to the overall performance of the company's products in the market. According to Louise, there are essentially eight critical steps in product development:

1. **The idea or vision** – a new product, a new range;
2. **Design of the image** – this may begin in house with refinement by a designer or at a graphics house or it may evolve in consultation with a designer;
3. **Development of formulae** – the company uses industry standards for benchmarking formulae, obtaining feedback from customers (both retail and wholesale) and Mt Romance agents. Final formulations are developed by a biochemist.
4. **Primary and secondary packaging** – where appearance and function are critical – taken from a customer and manufacturer perspective. Louise says, *"The best-looking container in the world won't get repeat sales if it is difficult to use. A container that looks good but is difficult to fill is equally an issue for concern."*
5. **Copy text** – to produce the information on primary and secondary packaging (box, container, box 'stuffer') to describe and 'sell' the product within relevant regulatory guidelines – e.g. cosmetic, listed or registered therapeutic and so on;

6. **Point of Sale –** material to support a new product or range (for both retail and wholesale). These may include posters, brochures, counter displays and samples (e.g. sachet), Graphics are usually produced for retail outlets and for shows or expos;
7. **Advertising** – in relevant magazines;
8. **Product sales information** – distributed to agents, wholesalers and retailers. Includes sales manual material.

The present challenge for product development is to coordinate between a growing group of stakeholders and contributors that make the process more complex and tenuous. Louise says it is critical for MRA to proactively anticipate and adapt to the changing needs of the marketplace, where in the future, the challenge would be to continuously come up with new ideas and constantly redesigning and reformulating their existing range of products. She says, that in their industry, *"One has to constantly whet the appetite of the customer with new and innovative products."*

Plans are underway to 'tidy' up its product lines and MRA's image and brand. The company has also begun to assess other indigenous Australian compounds that are rare, precious and those that could be harvested in a sustainable manner. Stephen mentioned that they were looking into grass tree oil that is extracted from dead leaf matter. Other plants being explored in the MRA laboratories are acacias and Geraldton wax.

CASE 6 | Smith's Aluminium

Background

Smith's Aluminium is located near the heart of Albany. Jim Cann is its owner and proprietor who established the company when he and a neighbour took over the business four years ago. Jim is born and bred in Albany and is a plumber by trade. He has owned various businesses such as retailing plumbing fixtures and bathroom fittings before his present venture in aluminium fabrication. Jim remarks that he prefers, "Not to do the same thing for very long…as I can't do nine to five shifts everyday…I always need change and a challenge…and like to do different things."

Jim's role involves him liaising with customers, suppliers and managing the five members of his staff. Looking into the future, he has plans to raise the value of the business, which in his view, is currently "stuck in the middle." Manufacturing roo bars and bull bars are staples for the company, but they are currently facing tougher industry standards on bar testing for vehicles that are in his opinion, constraints set up by the larger companies to impede competition from smaller players like him. Jim feels that there is currently too much dispersion of energy in terms of staff and time, with them juggling projects that are highly customised and irregular. These projects are usually time consuming because the specifications on each job are different. He realises that some products generate higher margins than others and they will have to balance both to keep the business viable.

According to Jim the company would rather focus on a few core offerings and develop complementary products allied to their existing product line that includes four-wheel drive accessories such as shock absorbers, springs, suspension, roof racks and winches. He believes that the consistency of manufacturing at a higher volume will allow for processes to improve and impart some consistency to production that will assist in developing the skills of apprentices. Smith's Aluminium also acts as an agent for established brands in vehicle accessories such as Opposite Lock, which provides them with added credibility in the market.

The Role of Design

Jim's focus on design is very much centred on the use of aluminium in products. He believes that there is great potential for combining different materials like stainless steel with aluminium and would like to see more designers being exposed to the many exciting possibilities aluminium presents. According to Jim, designing is a process that covers all aspects of a product's lifecycle, beginning with its creation to its eventual disposal or decline. He comments that this scenario means that designers must constantly evaluate a design with respect to a product's useability, functionality and longevity. As a consequence, a design's consideration should extend through every stage of a product's lifecycle, by using materials in a well thought-out manner and planning carefully for manufacture.

In his experience it is easier to deal with the government than it is with "someone off the street" as they are prepared to pay for a better product and more concerned about the longevity and quality of the outcome. Some customers want the product to be made as cheaply as possible, but still want it "to be great." Jim emphasises that something badly constructed, may not be useable in the end, also as a result the material is "going to last forever" as aluminium does not decompose.

Product Development Process

Jim comments that 50% of the work that gets commissioned involves heavy customisation and do not generate much in profits – they also tend to be time consuming and run on tight schedules. These projects usually mean that design, development and fabrication happen all at once. He adds that,

> *" It would be a relatively simple process if one knows what the client wants…You can't do too many fancy things, but you must know the strengths and limitations of the machines and materials."*

During the pre-production and briefing stage Jim aims to identify the issues and resolve them expeditiously before fabricating the product. The production process usually begins with Jim providing his interpretation of what is required for the project, by determining the specifications in terms of the size and shape of the product. A brief is derived which lists, the materials and specifications. If required, they also identify and explain to the customer, certain constraints that may be faced with the materials and processes used.

Simpler projects tend to be fabricated straight away, but for more complex or what Jim terms as "curly" undertakings, prototypes or detailed drawings are implemented – it is noted that some customers are willing to pay this step in order "to get a product that is going to last." As Jim points out, "It is far better to make prototypes and lose a day than to do it wrong. It also saves on materials and avoids wastage." This process is carried out either by Jim or the foreman (who has 13 years experience in aluminium fabrication) prior to fabrication. In terms of involving others in the design process "you cannot have enough input" but one must use time efficiently. Jim often sketches freehand isometric drawings and says that they don't have a need for more detailed CAD illustrations at present.

Jim explains that the skills required to work with aluminium manufacture is straightforward. In the different stages of fabrication however, the process involves a great deal of coordination in terms of staff, equipment and scheduling. For example, different types of welds need different levels of human skill and machine accuracy – the MIG (metal inert gas) weld requires 20% human skill and 80% machine execution; on the other hand, for TIG (tungsten inert gas) welds, which are more resilient entails 80% human skill and 20% machine execution.

Problem solving usually occurs at the beginning of the project, where much of the learning is acquired through Jim's experience working on a broad selection of projects. Development constraints usually occur because of the shortage with time, as work never stops. R&D time is currently missing from the firm agenda, and if done at all, the sessions will be organised after hours. Jim notes that it is not feasible to employ an office manager to make time for R&D because of the heavy financial commitment required. Jim has tried to approach government agencies for capital and help but was told that, "You will need something totally new and innovative to get funding." One of these days, Jim would like to develop his own bar testing equipment, a tube bending machine or look further into product opportunities in the camping industry – in order to find suitable platforms for growth and to enhance business performance.

CASE 7 | South Coast Fabrications

Background

South Coast Fabrications has been a manufacturer of stainless steel wine tanks and accessories in Albany for almost 14 years. It is a business enterprise wholly owned by Richard and Lenore Cooper. The company and its proprietors have come a long way since their humble beginnings of making bow rails for boats in a shed 20 years ago. They first ventured into wine tank manufacture for Goundrey Wines and are now servicing over a hundred other wineries around Western Australia. Their customer base includes wineries in the Great Southern region, Margaret River, Manjimup, Pemberton and the Swan Valley. It now offers a broad range of sizes and configurations for wine tanks that include; white storage tanks, red and open fermenters, potters and vats. Richard Cooper and Neil O'Keefe – the foreman, manage the business, and supervise the manufacture of wine tanks.

Neil is a motor mechanic by trade and is born and bred in Albany. Before joining South Coast Fabrications, he worked for 18 years at a local food processing company in the harvesting division as a maintenance manager. He has a keen interest in computer-aided drawings (CAD), and through his own initiative, purchased his own software package that he put into practice at his previous employment. He later completed a local TAFE course in two-dimensional CAD drawing. Neil finds he has to wear many hats in the company. Besides his role as foreman, he also visualises the designs using a CAD program, maintains the company website as well as other administrative tasks. He does not mind this multidimensional role as he takes an active interest in the business.

Neil comments that the wine tank industry is seasonal and with its low barriers to entry, is rife with competitors that undercut prices aggressively, thus creating a reactive environment heavily reliant on the continued growth and performance of the wine industry where long-term planning is problematic. He also adds that, loyalty is not prevalent with customers and they tend to go to wherever the price is lowest, even if it means buying an inferior product. The company aims to differentiate itself not by price, but by offering superior products and superior pre-sales and after-sales service. Their policy for "loyal and consistent pricing" and an extensive experience in product development has allowed them to build a strong position as a dedicated specialist supplier to winemakers in the State.

The Role of Design

Neil comments that design in not the core focus of the business, but it acts as an integral part of the manufacturing process. He says that,

> *"…If something doesn't look good, no one would buy it." He adds that he is, "Not sure what people look at when they buy something but maybe a combination of factors such as function, aesthetics working together, it may just be the trick. Two products could work equally as well, but details on how one looks at a product to make a purchase decision can come down to aesthetics rather than solely based on functionality."*

In terms of product design Neil points out that "Wine tanks don't have many distinguishing characteristics…there is not much you can do with them in terms of design." Functional features that are usually customised, for example are, diameters, heights, straight sides or cone tops – this doesn't leave much room for design or innovation. The frustration of not being able to volume manufacture is attributable to the

uncertainty in seasonal demand and according to Neil, "There is no such thing as a standard wine tank!"

Neil points out that their "biggest problem" at the moment is finding projects to keep them busy during the off-season between May and November. The pressure escalates for their 10 staff during the peak season and the stress caused by tight deadlines and overtime can cause workers to "burn out". He believes that the critical success factor for the business in the future is to always be looking out for, "Something that can become a product, to get away from the seasonality of wine tank manufacture." They are gradually learning to recognise design and manufacturing trends from their interactions with customers and attending trade shows.

The owners have recently spun-off a sister company, Austenitic Steel Products that fabricates all the accessories fitted onto their wine tank products such as – doors, expansion chambers and lids, thermo wells and screens. Austenitic was set-up as a separate business because the company realised that its dependence on the wine industry was not allowing it to plan for growth. The company also realised that a more focused strategy is needed to develop new products and extend their existing product range – and Austenitic would be the vehicle to do so.

The role of design in this case would be to diversify their range of offerings with new innovative products, reaching new markets and extending existing product lines as a value-adding service to current customers. It has begun to develop a varied range of products that include – spittoons for wineries; coffee tables; honey separators; swimming pool ladders; water tanks for trailers; flues for water heaters; bow rails for yachts; balustrades for commercial houses; and other customised projects such as a stainless steel water fountain for Evans and Tate wineries and the development of a fish cleaning table for the Albany Shire Council.

South Coast Fabrications is one of five local firms that have formed the Great Southern Engineering Group (GSEnG), where a united front of companies that used to view themselves only as competitors, now cooperate to reach new markets and to discover each others' capabilities in a non-competitive way. The group is advised by management consultants from Perth to assist them in tendering for projects in the city, either collectively or as individual companies. They have recognised that initiating a brand presence that looks professional is important for them to be viewed as credible candidates for larger projects. The design of the logo and business stationery was organised by the consultants in Perth.

The company also adds to its own business stationery, a tagline identifying itself as a "Member of GSEnG." Neil notes they have realised that cooperation and relationships can open up new possibilities and can see the benefits of the program in promoting the region rather than any particular company. In terms of internal corporate communications, their website is created and hosted by Darkroom Illusions, a digital media consultant in Albany. Neil has the task of updating the content of the web pages and uploading necessary graphics and photographs.

Product Development Process

The company's website claims that, "Purchasing a tank from us starts at the design stage. We offer free advice…that gives you peace of mind that you made the best investment." It continues to add that, "Superior manufacturing standards…give a cleaner and stronger finish…for a superior visual appearance…" going on to say that their

enhanced features, “In many cases will reduce your insurance premiums…corrosion resistance…are warranted against manufacturing defects.” Neil points out that they are still continually developing and improving new and existing designs, taking note of customer feedback and always considering how the final product is going to be used.

There are no formalised practices, but the core design team usually includes Richard Cooper, Patrick Bocain (production manager for Austenitic) and Neil. Richard usually conceptualises and provides the overall direction for product development – he usually leads the process by initiating concepts and getting input from Neil and Patrick as well as any other member of staff with interest or core skills to contribute. Neil says that the structure of the company is rather “flat”; there are clear roles for decision-making and each employee mutually supports each other, giving them the autonomy to be involved during the design and problem solving process. Problem solving usually occurs at the beginning of a project.

Neil often uses his computer skills to visualise the design of the products, explicit drawings can provide the layout of materials before manufacture, he adds that having CAD skills has made “his life easier” in terms of visualising prototypes, processes and mapping out scenarios before implementing a course of action.

In terms of the design process, Neil used the fish-cleaning table as an example of a unique product that had to be “designed from scratch.” In this case, they had an “open brief” from the Albany Shire Council. According to new regulations, fishermen are no longer allowed to clean their fish on boats but have to come back and do so at port facilities. The client knew that it wanted a table that was designed for multiple users and installed in a public space. The design team started by researching other facilities and found that they were “just kitchen sinks” and not designed for what they are supposed to do.

They came out with a plan and proceeded to “play” with the design. They wanted to design something the client would be happy with as well as a product that could be expanded into other applications and markets later on. The pre-design work is done to get a basic concept of the product and to develop some insights into the type of materials and mechanical parts that may be required. Engineering and plumbing expertise was outsourced to other professionals, with concepts driven by the core in-house team.

They make it a point to resolve design issues at the beginning of the process by asking, “Who’s going to use it and how?”, considering both tangible and intangible features to make the end product more ergonomic and user friendly. Neil remarks that, “If an end user is not happy with using it, they may end up damaging or avoid using it altogether.” Considerations for public usage incorporated functionality, longevity, safety, installation ease and security – where the tables had to be “idiot proof”. Security features were added for it to be vandal proof – the challenge for the fish table design was to cover all bases and still make it work. Aesthetics also played an important part – Neil states that it is definitely going to be, “Easier on the eye than a kitchen sink standing on a rusty galvanised stand.” As it is going to be installed at a gazebo at Emu Point, the public will see it, therefore, “It must look good too.”

CASE 8 | South Coast Wood Works Gallery

Background

Dean Malcolm is the owner and proprietor of South Coast Wood Works Gallery, situated along the South Coast Highway, around 35 kilometres outside of Albany. Born in Perth, Dean moved to Denmark 17 years ago to become a full-time wood-turner after completing his industrial design studies at the WA Institute of Technology (now Curtin University). He started out producing items such as bowls, platters, vases and a range of home wares (Laud, 2003) and has since extended his range to encompass furniture and other experimental pieces in wood that combine less traditional materials like stainless steel.

The gallery, that was inaugurated in 2001, is a "showcase" of the region's talented fine wood workers and is "stocked" by a stable of his own pieces as well as the work from 50 other individuals on consignment – from this group, there are 15 full-time professional wood workers, with the others being either part-timers or hobbyists (Laud, 2003). The gallery's interior is divided into three discrete product display areas; the first space shows contemporary pieces, the second is for furniture and general woodcraft and the third is for gifts, souvenirs, "knick-knacks" and coffee. Within its 18 months of operation, the gallery has generated an average annual turnover of $180,000.

Dean's work has predominantly been led by his own instincts and experiences, developing insights into market trends and pursuing a personal vision. He has steered the growth of his business in accordance with his values and taste in designed objects and also holds on to his independence as a key driver in contributing to the freedom to explore and produce objects he truly believes in. He has gained a reputation internationally for being one of Australia's leading wood turners, whose customers include local and overseas private collectors, corporate and government buyers and passing tourists. He also has work sold and exhibited at local, interstate and overseas galleries and in collections abroad such as The Bohlen Collection at The Detroit Institute of Arts (Designing Futures, 2002). Being selected to present one of his carved wooden spheres to the Queen and Duke of Edinburgh during their royal visit to WA in 2000 has been one of his career highlights (Laud, 2003).

The Role of Design

By being an entrepreneur, a designer and a small-scale manufacturer of his own work, Dean believes that design embodies several viewpoints; depending on the different roles he plays – whether it involves the design of a product or looking at it as a process to generate "creative outcomes." He constantly challenges himself as a designer, regarding the process of creation as a, "Fountain of knowledge, which never stops flowing as long as we are open to the possibilities…"

Dean continuously explores new materials and techniques by applying his knowledge in design principles in order to be at the cutting edge of creating with wood. His desire is to constantly improve quality through refining existing designs and introducing new ones. By honing his instincts and learning through extensive contact with customers in the gallery each day, gives him the insights into what a customer's latent needs and wants may be, which he considers something traditional market research fails to provide.

He has developed the ability to anticipate what people would like, creating a "pull" for demand instead of relying on requirements directed by customers. He realises that in

order to attract the purchase of an impulse buyer, the product has to appeal to the audience on an emotional level; it has to be "special and exciting". Dean also notes that the market wants quality, "But at the right price." (Laud, 2003). This aspect is integrated with the hallmarks of his own "style" and attention to detail – that all play significant roles in a product's success.

From a business perspective, Dean explains that, "Design is a process which doesn't just give us a competitive edge – as a one off thing – it maintains our competitive edge." He further adds that design allows the enterprise to continuously develop and expand, by creating and capturing new opportunities, as "Very few products will be expected to stand the test of time and remain unchanged as the business continues to grow and evolve…Design makes the business profitable, enjoyable to work in, secure in the long term, a pleasure for customers to deal with…inspirational for associates, dynamic and ever changing."

To illustrate how design is integrated into business processes, he explains that every facet of the gallery experience is "designed" – "the logo, business stationery, brochures, website, advertisements, location, signage, building, landscaping (including colour coordinating the garden plants), interiors, products – even sensorial experiences such as sounds (music) and smells…common themes reinforce each other, colours, shapes, materials are considered for their relationship to the overall design."

Almost all of the design elements above have been conceptualised, visualised and coordinated by Dean. When asked what his main reasons were to manage these non-core design activities himself, Dean explains that,

> *"I do like to have control over what's going on, and I don't think I would have the confidence in the 'other person' – a designer in whatever capacity – being able to understand the intricacies of my whole vision after a quick consultation…by the time I had gone through a project brief with the designer, I could have done the work myself and benefited from the experience…if I didn't have such a sense of independence…a strong vision and some design training, I would probably use them (design services in the region)"*

He further adds that because of the "struggling artist syndrome", the cost of employing the services of a professional designer may be prohibitive. Nevertheless, with his background as an industrial designer, he has the ability to use his knowledge of design principles and available technology to take on board the layout of corporate and promotional literature; and to design and model the gallery by doing virtual three dimensional "walk-throughs and renderings to get a good idea of the look and spaces." Furthermore, by engaging the expertise and collaborating with his network of family members, friends, other designer-makers, local builders, planners, engineers, printers and signage makers has allowed him to realise an overarching design vision.

In terms of benchmarking and the evaluation of design, he has a policy only to accept work that has the right "fit" for his gallery. He always makes a point to spend time with those whose work is not selected and provides feedback for improvement, such as a call for a more considered use of materials and better use of design principles. He has discovered that most people do welcome constructive criticism and this process allows him to build a gallery collection with the standard of products he is satisfied with.

Dean also believes in playing a role in nurturing the talent that resides in the region. "By facilitating design workshops, the business develops its profile as a centre for design, while assisting suppliers of products to improve their design skills." One of these initiatives is designXchange *(refer to Appendix 3 for media release)*, where a group of the Great Southern region's contemporary designer-makers in wood meet to discuss and review their current projects; to develop new work for exhibitions; to organise workshops by leading national and international designer-makers; to challenge the current status quo of design and to promote the unique resources of the region.

Product Design Process

Dean usually starts out the product design process by identifying a need or a potential niche in the marketplace for his more functional wares, where the outcome is more of a "forgone conclusion." Another approach begins with, "Open exploration of materials, processes, techniques, visual effects, functions (following form)…possible desires." This process involves more, "Fun and play…with no overtones of specific need…the product is more likely to be exciting and illuminating, appealing to the senses rather than the rational mind."

Ideas come from diverse sources, mostly from experience, inspiration from other craftspeople and experimentation with prototypes, tools and technology. Working first with sketches, he later draws a two-dimensional representation in a computer illustration program, then proceeding to work with a prototype and continuously refining details during the process. For more complex designs he usually does a three-dimensional (3D) electronic prototype in Form-Z – a professional software package that performs solid and surface modelling that has taken him almost six years to develop the expertise to use efficiently. He finds that using 3D representations can assist in selling ideas to customers, in addition to saving time and materials.

Dean emphasises that prototyping need not be expensive or time consuming. If used consistently, prototypes can leverage the success of the design process by clarifying and resolving problems, revealing valuable and unforseen discoveries and making it easier to review choices, to accept new ideas and change direction. After this stage, he proceeds to work out how a design can be adapted to manufacture in a dedicated workshop at the back of the gallery. The workshop has a collection of machinery, lathes, jigs and templates that is required for small volume manufacturing.

At most times, Dean attempts to revisit a product, continually refining the design by decreasing the amount of materials used, by introducing new design elements or by refining manufacturing processes. For simpler items in his range, Dean occasionally employs the skills of a "subcontractor" to replicate such items as kitchenware, business card and pen holders – briefing them in detail and supplying them with jigs and standards he has developed to produce the item. This allows him more time to concentrate on new concepts and to experiment with innovative processes for future products.

When the issue of collaboration with other manufacturers was raised, Dean expressed that there are many technologically capable enterprises that are not aware of the full potential of their equipment and own skills or about applying them to processes outside of their industry. He further adds that,

> *"If a manufacturer was asking a designer to design a specific product to fit a very precise market niche, based on researched consumer needs, that needs to be manufactured in a specific business with certain*

> *capabilities…oh how limiting! (But) If a manufacturer worked together with a designer, production staff, engineers, marketing people…to develop broad 'product' ideas within a loose framework based on, but not limited to the manufacturer's capabilities…and then collaboratively select and refine those ideas – then there is potential for some really exciting and innovative product development."*

He has concerns that manufacturers and designers may come to the table with separate agendas and varying levels of commitment to the process – from experience, some manufacturers view design as "filling the gap" when "things are slow." At the Designing Futures event last August – he observed that there was a lack of mingling between the two disparate groups. Despite that, he does find that the opportunities to be exposed to different skills, knowledge and capabilities of other firms is a prospect that will help realise new design territories, to help everyone think beyond the short-term and tap into the broader potential of how design can contribute to the region's wider community and generate long-term success and competitiveness for those involved.

CASE 9 | Wilson Machinery

Background

Wilson Machinery is a wholly owned family business operated by Gary and Jean Wilson, which was established in 1983. It is the design and manufacturing arm of Wilson (WA) Pty Ltd. The other division, managed by their son Ian, is a machine-wrecking yard that is set up next to the company's manufacturing facilities. Wilson Machinery has built its business around innovative and well-designed machinery, establishing a solid reputation for the design and manufacture of quality agricultural machinery for farming enterprises, State and local government and sporting bodies.

Gary was a farmer and contractor by trade and started this business because there was a demand for designing and manufacturing specialised farm equipment. His flair for engineering design comes from his own readings and taking courses, but most of all, from his passionate interest in machinery and how things work. Gary prides himself for having a highly retentive memory and impressive deductive reasoning, which has put him in good stead to gauge a customer's particular needs and requirements. With their extensive experience in farming and contracting, the Wilsons have been able to build an extensive range of efficient machinery that consists of slashers, mowers, mounders, front-end loaders and 3-point linkages.

The Role of Design

When asked what design meant to them and the business, the Wilsons reveal that their business revolves around design. The company's product design philosophy is to develop superior equipment that offers *"simplicity, durability, ease-of-use and achieving the best performance".* They have adopted a policy for the constant improvement of their products as well as to provide superior sales and backup service to their customers. The company benchmarks the design of their products and practices by Gary's personal standards, the degree of customer acceptance and requests, past experience and by their competitors' shortcomings. It is important that Gary and key staff have input in all design aspects of the company, from product design, corporate communications to branding.

After 20 years in the business, Gary has seen that there has been a big leap from the manufacture of machinery in the past, where providing superior functionality through engineering, was the main differentiator between competing products. Nowadays the finish, polish and paintwork also make a difference to how his customers perceive the value of a product. In other words, the product not only has to work right, but it also has to look right. Although most machinery has standard moving parts and configurations, it is still necessary to customise equipment for specific user needs and working conditions.

His knowledge of the market comes from his past experience in problem solving and manufacturing and his contact with customers – such as agricultural field days as well as State and national trade shows. Corporate branding during field days is an important element; for example, they set up fold out marquees, with signage painted in their corporate colours of bright blue and yellow. Their corporate colours are also incorporated onto the paint finishes of their machinery, communications (eg. product guides and advertising) and website.

The business does much of the design for its corporate identity and corporate communications in-house. As they are a family-based company, it is essential that their key members of staff are multi-skilled and in addition to their main tasks, also deal in

areas of product promotion, brochure design, advertising and marketing. For example, when producing a brochure, Gary would usually take the photographs and Jan his secretary or Dave the "computer fix-it man" can trim and enhance the images in Photoshop. After the design is laid out and technical specifications determined, the electronic files are stored on a disc and forwarded to the printer at the Albany Advertiser for their input on printing.

They have also employed a student who is taking leave from his engineering studies in university to improve their ability to archive and complete technical drawings that Gary doesn't have time to do. If this "experiment" works well, he may expand the student's role into the production of low volume operator manuals and procedural guides. Gary has realised the importance of archiving and documenting projects, now that the company has grown. He explains that the biggest mistakes are attributable to a breakdown in communication, where there is a need for standardised drawings that can act as a tool to get everyone to share a common "language." The style of drawings and specifications has to portray a consistent message, in order to act as a mechanism to minimise mistakes. Another reason for the manufacturing specifications to be recorded in detail is so that the team does not overlook what has been done before in order to save time when a similar design is required or comparable problems arise to be resolved.

These activities can absorb much of Gary's time and he commented that the energy expended could be spent on other business operations. The main reason for having an in-house team performing design activities is they feel that they have the "best handle on most of these areas" and feel a sense of involvement in the process. If they have insufficient in-house knowledge, external guidance is always obtained and it is mostly available locally through printers and a web designer. Advertising is usually on a State or on a national level therefore, some advice is outsourced beyond Albany.

When asked whether he thinks that he will employ the services of a professional designer in the future, Gary noted that he can see the benefits of it saving them time and effort. The most important criteria for selecting professional design services will be the ability of the designer to understand and communicate with him. Cost is also a factor, as it is important for him to know that he is getting value for money.

Product Development Process

It is Gary's role to "dream it up", acting as the primary designer and coordinator of product development and manufacture. Gary's working methods involve an emphasis on learning from trial and error. His high standards in engineering design and product design raises the bar for everyone in the way they relate to problem solving and evolving design sensibilities.

The product design process starts by identifying a need or a problem. By asking the right questions, he can develop a better understanding of both the intrinsic and extrinsic requirements of a customer. After the briefing stage, Gary and his team identify the technical parameters and engineering "rules" he has standardised over the years as well as drawing on the learning and knowledge accumulated through past projects. Gary is well known for his penchant for drawing his ideas in the sand, which he later translates into more detailed working drawings. With basic sketches and calculations complete, he and key personnel map out the mechanical details first and looks at the whole chain of upstream scenarios that can affect a product's design and manufacture.

He later presents a few options to the customers and goes through the advantages and disadvantages of each approach – costs, purpose, context of use and so on – allowing them to choose accordingly. When a direction is determined, Gary then proceeds to refine and consolidate on a final design and produce more explicit drawings. This process then leads to a working model or prototype, which will be fine-tuned as they go along. Gary again mentions that communication is always the biggest challenge as it is central to the perception of design and functionality from the customer's point of view. For example, the interpretation of drawings and equipment varies from one individual to the next; and in some cases customers come for consultations but end up wanting to make it themselves, without fully understanding the principles that are inherent in engineering design.

External collaboration is also an important aspect of product development. For more complex projects he often involves a team of highly skilled tradesmen from a network of technical experts – such as hydraulic and electrical circuit designers – that consult on specific aspects of a project. He remarks that Albany is abundant with excellent tradesmen and he has developed rigorous selection criteria for choosing those he works with. He has a list of external specialists that he has worked with over the years and sourced through his networking circles, such as the Great Southern Engineering Group (GSEnG).

Gary says he has, "A knack of knowing where to get the right skills and expertise together." He adds that having good people around him, attracts better people and elevates the performance standards of individuals working with them – in his own words, "Standards breed standards." Gary believes that by cooperating with a multidisciplinary group of people, he can tap into the skills and knowledge of other individuals and businesses that are critical to creating superior products. He considers all sources of information and expertise not only as valued advisors but also as friends; and their long-term interaction has led them to develop close professional and social relationships.

SECTION 4

Case Findings

This report presented detailed case studies of nine manufacturing firms in the Great Southern region. The following findings will help illustrate the form design and product development process takes among the firms and will compare their practices to those reviewed in the literature in Section 2. It will attempt to draw out some of the key issues that companies face in relation to the use of design in their businesses.

As introduced in the literature reviewed, the term 'design' is defined in this paper as provided by Walton (2002):

> *"Design is both process and product. It is a way of thinking synthetically, of looking at problems in unexpected and creative ways, and seeking innovation. It is also about specific outcomes – products, graphics, communications, and environments. More broadly, it is about how consumers and stakeholders experience these outcomes…the design interface must be all these things – a strategy for action, as well as the results of those actions and decisions."*

Table 3: Vital statistics of case study firms.

Company & Location	Nature of Business	Customer/s	No. of staff	Years in operation
CASE 1 Albany Engineering Roundhay Road, Albany	Design, manufacture and service of marine and general agricultural machinery Includes fitting and machining; and welding	Farmers, mine sites, grain handlers, vineyards, marine	8	8
CASE 2 AQ2 Daping Street, Katanning Shenton Park, Perth	Design, manufacture and sales of Smartaflow & Portaflow, turn-key sodium hypochlorite water disinfection systems Currently expanding product line into other markets	Potable water disinfection industry (eg. Water Corporation)	10	3
CASE 3 Coastal Stainless Chester Pass Road, Albany	Manufacturer of stainless steel tanks	Wine industry, and other wine-making equipment Other customised work include marine and surgical equipment	6	4

CASE 4 Finewood and Landscape Design Landcaster Road, Albany	Landscape design Fine wood work	Landscape design for local and State government in Albany and surrounds Supplies regional galleries and private clients in fine wood work	1	3
CASE 5 Mt Romance Australia Down Road, Albany	Australian sandalwood oil production Marketing of packaged Australian sandalwood products R&D into other Australian sandalwood applications	Cosmetic manufacturers in Australia and overseas Cosmetic and tourism retailers	48	10
CASE 6 Smith's Aluminium Monck Lane, Albany	Various aluminium fabrications – boat repairs; automotive accessories eg. roo bars, roof racks and canopies Other work can include fire fighting units to order Retail 4-wheel drive accessories	Local car owners, farmers	6 – 8	4
CASE 7 South Coast Fabrications Chester Pass Road, Albany	Manufacturer of stainless steel tanks	Wine industry, and other wine-making accessories Sister company, Austenitic Steel Products manufactures for the general stainless industry – spitoon	8 – 10	14
CASE 8 South Coast Wood Works Gallery Torbay via Albany	Gallery that retails and exhibits regional wood work – functional and non-functional timber wide range of about 40 different product Design and manufacture of timber products – some speculative designs and also to client briefs	Tourists, locals, other retail outlets	1	2
CASE 9 Wilson Machinery Torbay via	Manufacture, design and sale of specialist agricultural machinery – includes a large range of 3 PL and PTO driven	Local and interstate farmers, horticulturalists, state and local government	8 – 10	20

Albany	accessories	and sporting bodies		

The general picture painted above of the case study firms indicate that the companies are predominantly based in the Great Southern region. The number of years these firms have been in operation range from 2 to 20, and an average of around 7 to 8 years.

The companies are involved in small to medium scale production. Many companies do a considerable amount of customised work ranging from stainless steel and aluminium fabrication, timber products, and farm machinery. Two companies stand apart, namely AQ2 and Mt Romance Australia. AQ2 was initially formed specifically to enable the development of a highly specialised water disinfection unit that was invented in Katanning; and Mt Romance concentrates on the commercialisation of sandalwood and emu oil cosmetic and therapeutic products.

The role of design and product development process

Table 4: Design use within case study firms

Company	Trigger/s Design/PD*	Design In-house	Design Outsourced	Organisation of Design/PD*
Albany Engineering Company	Problem solving To meet clients needs	Engineering design	Signage (building)	Ad hoc
AQ2	Problem solving Product refinement – benchmarking Marketing R&D – IP Expand product range	Engineering design CAD drawings	Product, graphics, signage	Ad hoc & planned with some processes in place
Finewood & Landscape Design	Problem solving To meet clients needs Expand product range	Product design	Graphics (printers)	Ad hoc
Coastal Stainless	Problem solving To meet clients needs Marketing	Product design CAD drawings	Graphics	Ad hoc & planned with some processes in place
Mt Romance Australia	Problem solving Product refinement Marketing R&D – IP Expand product range	N/A (Only conceptual and coordination)	Product, graphics, packaging, architectural, landscape, retail space	Planned with formal and informal processes in place
Smith's Aluminium	Problem solving To meet clients needs	Product design Graphic design Architectural design	Signage (building & vehicular)	Ad hoc
South Coast Fabrications	Problem solving To meet clients needs To expand product range	Product design	Signage (building & vehicular)	Ad hoc & planned with some processes in place
South Coast Wood Works Gallery	Problem solving Product refinement Marketing R&D – IP Expand product range	Product, graphics, architectural, landscape, retail space	N/A (outsourced printing and fabrication)	Ad hoc & planned with some processes in place
Wilson Machinery	Marketing tool – brand development Product refinement	Engineering design CAD drawings	N/A (outsourced printing and fabrication)	Ad hoc & planned with some processes in place

* PD = Product development; IP = Intellectual property;

According to the working definition of 'design' and based on the case studies reviewed, it can be inferred that the manufacturers interviewed are all aware of design as both process and product, where problem solving and innovation is integral to the role design plays in each company. Stakeholder experience is also an important element in all cases, where the emphasis is on user-centred solutions that endeavour to meet their customers' needs. All manufacturers and designer-makers follow a focused or combination of a focus-differentiation strategy as their products target specific niche markets.

Although the drivers and contexts for product development and design integration differ from case to case, the **triggers** (identifying deficiencies in existing product design, identifying a need or gap in the market, to innovate, to redesign), **process** (start with a problem, ideation/inspiration) and **approach** (through trial and error, experience and learning, through collaboration with professional and social networks) were rather similar.

Problem solving and communication is critical at the beginning of the process, but plays an integral part in the overall development process. **Communication** with staff was raised by the firms as a critical activity and has been attributed to costly mistakes or product failure. It was noted that much explicit communication was done through drawings, specifications and prototypes. Issues pertaining to the archiving of drawings in electronic form are systems that the firms are working towards or have in place. Most of them found detailed, CAD-like drawings to be important communication tools with customers, as well as between staff and collaborators alike – they were important to align ideas and technical specifications which ultimately save time, cost and errors further downstream.

Table 4 illustrates the roles in-house and outsourced design activities play in each firm. Corresponding to the literature reviewed, it was found that there is an over-reliance on the skills and experience on the entrepreneurial founder in the firms investigated – as for all core products the owner/operator and one or two key individuals directed development and design activities, in most cases.

Table 5 reveals that with the exception of AQ2 and MRA, the founder or owner-manager manages most firms. This type of management pattern is typical of the first phase of growth that SME experience, where the firm's focus on creating products for niche markets. Owner-managers are technically and entrepreneurially oriented and value their independence. They are inclined to work long hours while earning a moderate income. So far, MRA and AQ2 have increased delegation and were able to create a management team around them, which gives them the ability to focus on larger strategic issues in order to grow the company. To manage SME growth, the literature states that founders have to find the right balance in being a hands-on practitioner in tandem to being a business manager – it is often experienced that there is a lack of time to manage the business while operating within it.

The effect of leadership is apparent, when it comes to championing quality and to create awareness of design use. The focus on design usage in the cases centres mainly on engineering and product design and is used mainly as a product development tool. It was found that design was not easily isolated from all other routines in product development, as it overlaps and is iterative in relation to other processes – demonstrating that the firms were conscious of integrating design as a critical element rather than a discrete process. The interviewees were also aware of the benefits of integrating design and problem solving early on in the development process to avoid costly errors and inefficiencies in manufacturing at later stages.

Table 5: Outcomes of design use

Company	Management	Nature of production	Distribution	External equity/Funding
Albany Engineering	Sole proprietor	Customised one-offs	Local	NA
AQ2	Under management	Turnkey solutions and batch production	WA, Interstate, international customer enquiries	COMET grant, Equity investors
Coastal Stainless	Sole proprietor	Customised one-offs to batch production in factory	Local	NA
Finewood and Landscape Design	Sole proprietor	Customised one-offs and batch production	Local, interstate, international	NA
Mt Romance Australia (MRA)	Under management	Commercial production in factory	Local, interstate, international	R&D Start grant, venture capital, angel investing
South Coast Fabrications	Sole proprietor	Customised one-offs and batch production	Local	NA
South Coast Wood Works Gallery	Sole proprietor	Customised one-offs and batch production	Local, interstate, international	NA
Smith's Aluminium	Sole proprietor	Customised one-offs	Local	NA
Wilson Machinery	Sole proprietor	Batch production	Local, interstate	NA

Design can be acknowledged as a subjective area, as the difference of perceptions in identifying what constitutes 'good' design and 'bad' design is a matter of personal opinion and context, as well as the exposure of the interviewee to professional design standards and manufacturing best practices. There were similar constraints for most firms in terms of resources such as time and capital for R&D, as well as the low usage of professional designers in the region – which contributed mainly to the proliferation of **'silent design'** activities in most firms. As commented by some firms, the lack of design service usage is mainly due to the lack of expertise available to the region, when outsourced, professional design expertise is usually found in Perth.

With the exception of a few participants such as MRA, AQ2, Wilson Machinery and Coastal Stainless, the other manufacturers and designer-makers have not had external exposure to outsourcing professional designers. It is clear that those with previous interactions with professional designers tend to have had a broader appreciation for collaboration externally. As illustrated in AQ2's case, the inventor's intense relationship with an external designer had a positive influence on the attitude towards design use for the entrepreneur as well as his staff – which correlates with the literature findings in terms of design acting as an agent for change in behaviour and in the regulation of the product development process.

Although individuals in firms that engage in design activities were not formally qualified, the persons that have had previous exposure to design training and professional design consultants; or formalised business planning procedures (MRA, AQ2, Coastal Stainless, Finewood and Landscape, Wood Works Gallery and Wilson Machinery), had a more systematic approach towards the product development process, exhibiting conscious

planning of key development activities such as multidisciplinary teamwork, regulated product development cycles, specific time and personnel allocation for R&D and built-in prototyping methods. Firms with more formalised processes tend to also be exposed to markets beyond the region as well.

Strategic and systematic design and product development processes are developed when companies like AQ2 and Mt Romance have a particular innovation to commercialise. These companies are noticeably different from the others in their approach to design use and the management of their innovation system. Benefits such as, access to external funding and having a professional management team, are aspects that have markedly improved the growth and prosperity of these two companies.

Focus Group Discussions

The focus group members were chosen because of their participation in the interviewing process as well as their reputations as key members of the manufacturing and designer-maker communities. This section presents the findings of a focus group held at the conclusion of the interviews. Please refer to Table 6 for an overview of key issues raised (refer to **Appendix 4** for a list of attendees and summary of discussions):

The focus group revealed that most manufacturers and designer-makers in attendance are willing to **minimise the risk** of diversification through a tentative **collaborative structure** that is supported by adequate resources and sound infrastructure. One participant said that products need not be entirely designed in the region to create more jobs and economic benefits.

Focus group members also raised the issue of key **knowledge gaps** in terms of knowing where each other's capabilities and expertise lie. It was also mentioned that an understanding of materials in relation to their inherent qualities and constraints would help account for resources available in the region. The discussions confirm that almost all the participants concentrate or specialise in a particular niche market, where they strive to deliver superior designed products through considering user-centric issues of functionality, ergonomics and customisation.

Table 6: Summary of focus group discussions.

Discussion Topic	Participant Response
To discuss broadly about the role of design for industry To examine design as an importance resource to their businesses and the region What is the market like? Knowledge use to advance industry	• Businesses aim for superior designed products through concentrating on user-centric issues of functionality, ergonomics and aesthetics; • Most projects are highly customised; • Branding is an important factor to reach markets outside the region; • Targeting niche markets is in the nature of the industry in the region – "our region's forte" – where it exists as both a strength and a constraint to reach larger markets; • Keeping manufacturing in the region was important – according to one participant, it needs not to be entirely designed here in order to create more jobs and economic benefits for the region
To share their views on the use of professional	• Noticeable lack of professional services available in Albany and the rest of the Great Southern Region;

designers and other services	• There is not enough work here to support services; • Designers can creatively solve problems, as they are trained to do so; understanding of design principles, professionalism, and ability to make something work, can be a catalyst; • Under utilised capabilities in the region and knowledge gap (eg. need for more product knowledge before R&D) • Professional designers usually acknowledge copyright and IP issues when starting a project • One member pointed out that one really had "to do it all yourself"
To enquire whether manufacturers and designer-makers are to willing collaborate on projects	• Issues of trust and ownership seem to affect most participants; • Design emphasis is different between engineering design and product design (but agree that functionality is important) • Excitement on the prospects of collaboration; we can't afford to wait with the chicken and egg scenario – collaboration may help; • Some participants have said that their purpose for attending the focus group was to continue the momentum generated by the "Designing Futures" event last August; • Others from the Light Industry Cluster mentoring programme expressed that the change of attitude has been significant for people who used to compete now collaborate to find new markets; • "Can we throw some money into the hat? Can we do something about it?" – Don't want this to be another think tank exercise, with no objective; • Keen to set up collaborative structure to facilitate this process – but noted that funding, industry involvement, marketing etc

Industry Network and Stakeholder Relationships

The manufacturing industry is viewed as highly fragmented, but due to the limited number of firms that were reviewed, the selected participants in the research cannot be seen as representative of the whole. Currently, the firms are mainly participating in batch production processes, with no volume manufacturing being evident. Although the firms are highly innovative in offering customised products, the majority of them exhibit tendencies to be comfortable in competing within their own niche and diversification is not yet apparent in the firm agendas (with the exception of MRA, AQ2 and South Coast Fabrications).

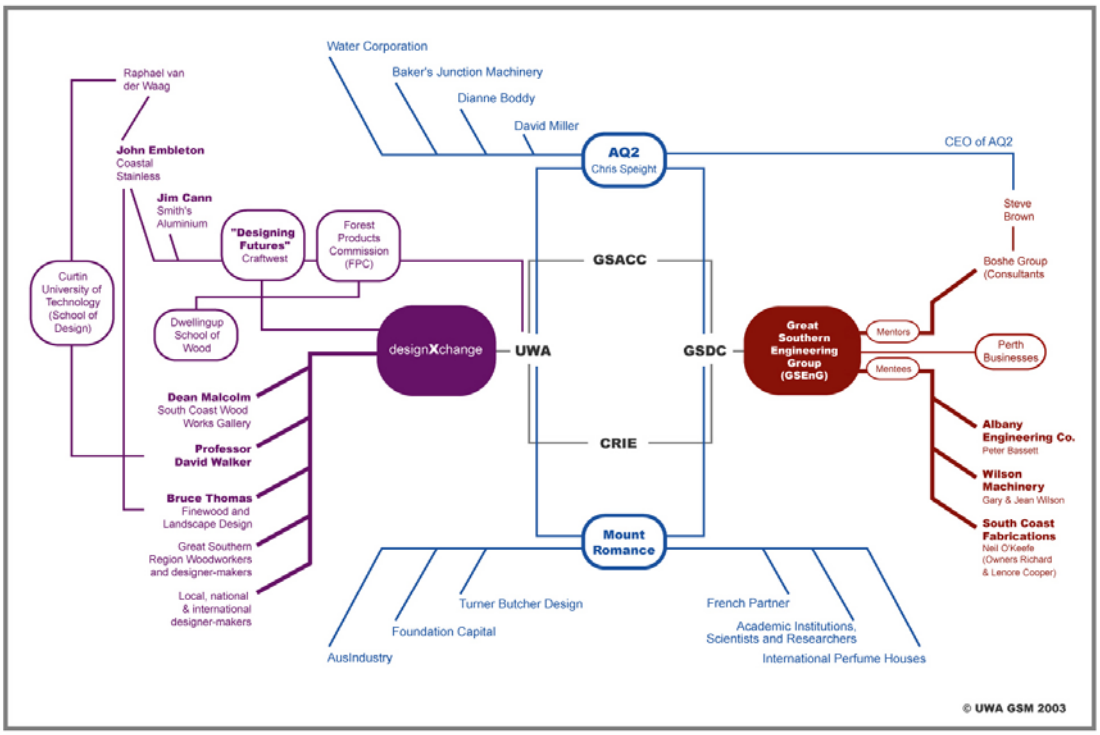


FIGURE 6: Networks and relationships identified from the case studies.

The networks that were identified from the case studies have been simplified and represented in **Figure 6**. The current scenario describes two potential collaborative groups – **designXchange and GSEnG** – that have their own established group norms and respective shared values, mental models and networks. There may be an opportunity to form related communities between these two disparate groups to form "the engine of innovation" (Weiss 2002), which that may lead to new markets, new products and possibly new industries in the Great Southern region (Miller and Morris 1999).

Industry workshop and networking forum

CRIE members organised an industry workshop to review the findings and to discuss the strategies suggested in the report. The workshop aimed to inform industry participants of the role of design within the manufacturing sector, and to present the insights of two regional firms and their effective integration of design and product development processes that have enabled innovation and enhanced business performance.

- Chris Speight, Technical Director of AQ2, shared his experience of the use of professional designer and effective product development processes that have contributed to the successful commercialisation of the Smartaflow® Chlorisafe® system;
- Steve Birkbeck, Managing Director of Mt Romance Australia, presented a case on how the implementation of their design and marketing strategy has enabled them to continuously create innovative products and strengthen its global brand

The workshop also acted as a networking forum, bringing together manufactures, designers, government and other community organisations that normally would not be associated. The workshop also further informed the research team of the problems and

needs of local industry and their likely acceptance of future strategies, such as the formation of the Great Southern Product Development Centre (GSPDC).

SECTION 5

Recommendations

The objectives of this study were to examine the role of design and product development and the capabilities that facilitate innovation within firms within the Great Southern region. In our examination of the case studies, it was found that design was used widely and championed by the leaders and key decision makers in all firms. Design was seen as a creative process that solved problems and satisfied customer needs.

Overall, firms in the region displayed a strong culture for innovation, but most businesses continue to struggle in their search for growth in the region – it was observed that factors such as the small size of the local market; firm resources (time, labour, finance, expertise); and was restricting pathways to growth. The manufacturing is fragmented and boasts a varied range of product offerings. Apart from the obvious comparative advantages in the region (eg. Life-style, availability of skilled trades people), there is little evidence of competitive advantage, such as infrastructure and services that manufacturers can leverage to grow competitively and look beyond regional markets.

Recommendations for further action will revolve around creating overlapping communities of practice in order to bring together the two disparate groups highlighted in **Figure 7**, and engage the wider manufacturing community. The recommendations have been instigated on the premise that the inherent intentions of both groups – which currently exist as separate communities of practice – is to harness the capabilities and knowledge of individual group members in order to pursue growth in their respective enterprises, to generate new product development opportunities and to reach new markets.

Recommendation 1: Bridging communities of practice

There are two distinct "communities of practice" identified in this research – the designXchange group and the Great Southern Engineering Group (GSEng). The interviews revealed network characteristics within their distinct groups reflect close and strong links that are durable, but their level of knowledge exchange tend to be similar to each other and the degree of innovation is generally low to medium between network partners. The challenge in this case is to bring these disparate groups to network to exchange richer information that can shift members in each distinct group, away from their comfort zone and explore new ways of thinking.

In view of this situation, strategic network theory suggests firms should look beyond its own walls to bridge these capability gaps by collaborating within informal and formal contexts with its network of partners, suppliers and customers – which have the potential to be catalysts in knowledge creation and the diffusion of innovation. Cooperative arrangements such as strategic networks benefits both parties by helping to assist in knowledge, technology and skill transfer; access to resources and markets; lowering the risk of investments in new product development and technology diffusion.

Collaboration, learning, and exchange of knowledge in a fast changing economy, can be achieved by the formation of 'bridges', where a range of networks can establish

opportunities for members of each group to interact and discuss ideas. This dynamic situation has the potential to generate a virtuous cycle of events that may create the 'engine of innovation' to nurture future growth in the region.

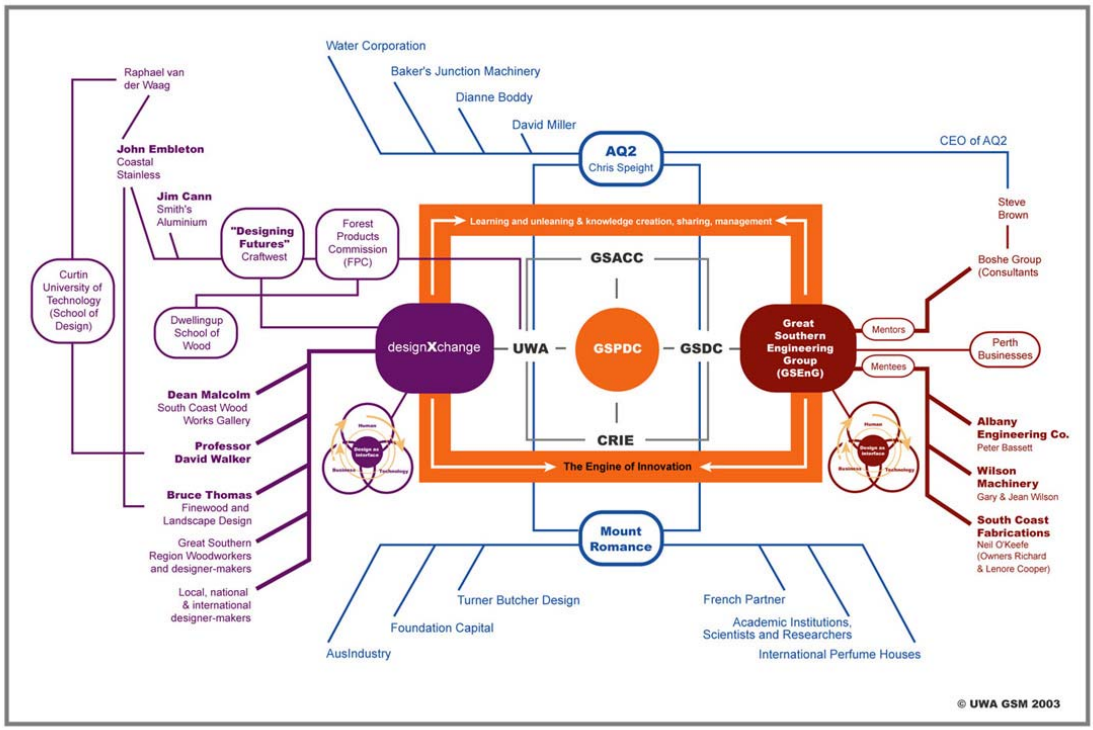


Figure 7: Creating 'the engine of innovation' by creating a bridge between two different communities of practice.

Recommendation 2 – Developing an innovation network: the Great Southern Product Development Centre

The industry workshop revealed that there is an insufficient concentration of firms that require professional design and product development services. Research revealed, however that the Great Southern region has many innovative individuals and firms involved in manufacturing and the craft industry that can benefit from the development of a centre that provided a coordinated and integrated network of design and product development support agencies and programmes.

Most firms examined base their offering by identifying a niche in the market, resulting in highly specialised knowledge and skill sets. This aspect of specialisation is a key strength and competitive advantage of most firms. In regions around the world, for example in Italy, local industries thrive on design specialisation and collaboration between the different manufacturing capabilities within their regions.

By establishing the GSPDC, in addition to facilitating the implementation of Recommendation 1 (please refer to **Figure 8**), the intent of the GSPDC is to build the capacity of the regional manufacturing community to develop an industry that will add value to the region's innovation system and enable individuals and firms to strengthen and diversify their current products and processes through;

- Knowledge/education program – Regular knowledge exchange and build opportunities through joint projects eg. Forums, industry best practice, skills development;
- Commercialisation program – eg. R&D, product feasibility studies, product development feasibility assessment teams to audit products through specialists or a committee, IP strategy;
- Market development program – gather and analyse market intelligence, identify market opportunities;
- Network support program – to grow a network of professional services and expertise in financial, business development and research – to build and move businesses ahead; people who are trained to be at the frontline; to get owner managers to think of the opportunity cost of doing it all by themselves may be too great; and forging public and private partnerships, eg. local industry and govenment

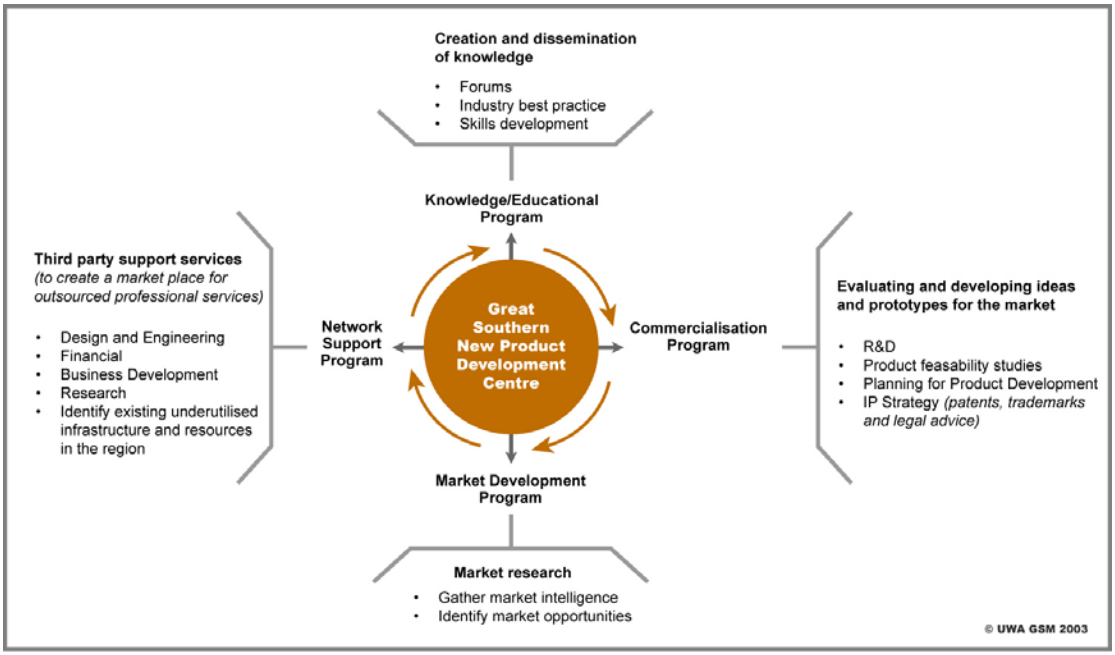


Figure 8: The proposed innovation network, the Great Southern Product Development Centre.

It is suggested that the GSPDC be built on a convivial infrastructure that is flexible, open to change and influence. The focus for the GSPDC is to act as an incubator and should aim to enhance the manufacturing sector's international competitiveness. It was raised in the industry workshop that government should be the conduit, a facilitator to guide industry in terms of accessing adequate resources and expertise for the GSPDC.

With better knowledge and understanding of strategic issues to do with the application of design and product development, it is likely that the region's manufacturing businesses could improve their competitiveness and export prospects. Developing a strong group of businesses focused on well-designed products should also attract more investors and visitors to the region.

Recommendation 3 – Suggestions for further research into the impact design has on business performance

It was impossible to address in this exploratory study, all the beneficial aspects of strategic design use when faced with the constraints of time and resources available. In light of such a fragmented manufacturing industry in the Great Southern region, not all sectors were consulted in terms of reporting their specific needs, strengths and weaknesses. Further research will also help prove to the industry, government bodies and educational institutions, a sound basis for developing a design-conscious industry and community, for the region to increase its competitiveness, economic development and community awareness.

Further studies assessing the tangible value of design to the manufacturing community need to be undertaken in order to build the confidence of government, firms and other institutions to invest their resources strengthening design capabilities. The costs and benefits of design investment have to be examined and communicated in order to elevate design from a peripheral activity that is often seen as an add-on, usually arriving too late to be a significant contributor in the manufacturing process.

The case findings suggest that most manufacturers currently are not strategically integrating design into the management of their businesses. In order to convince managers in small and medium-sized companies, more explicit data is required to demonstrate the evident contributions of design to commercial performance at a product or project level.

Further research should be pursued into the context of what impact effective or ineffective design use has on the performance of businesses. The research should identify the tangible and intangible aspects of design's impact on an organisation, such as increased employment, turnover, profit; improve quality of products; reduced costs; the development of new markets; increased market share; improved internal communication with staff and customers; improved image of the organisation; increase in competitiveness and productivity; introduction of new products or services and so on.

Specific data and case studies should be gathered to illustrate these potential benefits, and be shared with industry, policy makers and other interested stakeholders. It would also be beneficial to request consultations with national and international bodies that may have done similar research. This may assist in devising an appropriate framework for further research.

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Appendices

Appendix 1: Case study interviewees and data sources

Company	Interviewee	Data Sources
Albany Engineering Company	**Mr Peter Bassett** Owner/Proprietor	Face-to-face interview Site visit Email questions and answers
AQ2	**Mr Chris Speight** Technical Director	Face-to-face interview Site visit Company website Media Release Newspaper articles **Focus group member**
Coastal Stainless	**Mr John Embleton** Owner/Proprietor	Face-to-face interview Short discussion with Mr Raphael Van der Waag – second year apprentice with a degree in Industrial Design from Curtin University Site visit Email questions and answers **Focus group member (Raphael only)**
Finewood and Landscape Design	**Mr Bruce Thomas** Owner/Proprietor	Face-to-face interview Site visit Email questions and answers Observer in designXchange meeting **Focus group member**
Mt Romance Australia		
South Coast Fabrications	**Mr Neil O'Keefe** Foreman	Face to face interview with Foreman Site visit Email questions and answers Company website **Focus group member**
South Coast Wood Works Gallery	**Mr Dean Malcolm** Owner/Proprietor	Face to face interview with proprietor Site visit Email questions and answers Company website and other online sources Magazine article Observer in designXchange meeting **Focus group member**
Smith's Aluminium	**Mr Jim Cann** Owner/Proprietor	Face to face interview with proprietor Site visit Email questions and answers **Focus group member**
Wilson Machinery	**Mr Gary Wilson** Owner/Proprietor	Face to face interview with proprietor Site visit Email questions and answers Company Website Product Guide **Focus group member**

Appendix 2: Sample interview questions

Background

- Could you talk to me about your own personal background?
- Could you talk to me about the background of the company?
- What would be your role in the company?

Role of design

- What does design mean to you and your business? Is design considered important in your business?
- How do you benchmark the design of your products and design practices?
    - eg. against competitors, international best practice, lead user requirements, suppliers, past experience, other sources?
- Have you ever engaged in the following design services?
    - Please state who was leading the project. Could you list the company or key individuals involved and whether these services are in Albany, Perth or elsewhere?
    - How did you feel about the services provided? Did you feel you received any value from the experience? How was it beneficial or how was it not?
    - Did you have a sense of involvement in the production of the design services? How so?
        - Corporate Identity (eg. logo/s, business stationery, vehicle/livery graphics, uniforms, signage)
        - Corporate Communication (eg. brochures, sales kits, flyers, other advertising and promotional material, multimedia presentations, corporate videos etc
        - Building and environmental (eg. architectural, workspace design, interior design, point of sale displays)

Product design process

- Could you describe to me a typical product development process?
- Who was involved in the project? Internal staff and external experts?

Appendix 3: designXchange media release

(Source: Craft West, February 2003)
designXchange News – Press Release
designXchange - Contemporary Designer/Makers in Wood

designXchange is a group of contemporary designer/makers in wood who have joined together in the Great Southern region. The group has been meeting informally over many months at Dean Malcolm's Fine Wood Gallery located between Albany and Denmark.

The members of designXchange regularly review the ideas explored in current works-in-progress. The group provides feedback and encouragement as new designs emerge from the uncertainties of the conceptual stages to the pragmatic processes of testing and development. The group is now in the process of developing new works for a major exhibition to highlight the exceptional talents of the Great Southern region's finest contemporary designer/makers in wood. In accordance with the group's aims the exhibition will also promote the unique wood varieties of the Great Southern and Western Australia.

The exhibition is being developed with the working title "designXchanges" and Marina Lommerse, senior lecturer and head of Curtin University's interior design courses has agreed to be its curator. Members of designXchange include Bruce Thomas, Les Trouchet and Trevor Barnes of the Albany region; Dean Malcolm, Chris Reid, John Major, Anthony Docherty, Steve Ayling and David Walker of the Denmark region, together with Darryl Harris of Mt Barker and Clive Kendrichs of Walpole.

The stimulus to create a formal group followed in the wake of the activities surrounding Craftwest's "Designing Futures", an international forum dedicated to fostering excellence and innovation in contemporay wood design. Several designXchange members attended the forum that was addressed by leading national and international designers and makers. (See www.designingfutures.com.au for more detailed information)

designXchange member, Dean Malcolm, whose work was represented in the international exhibition accompanying Designing Futures, was instrumental in negotiating the recent visit of two forum speakers. Todd Hoyer from Bisbee, Arizona, USA, and his partner Hayley Smith, formerly from Wales, UK, presented a workshop and slide lectures at the Fine Wood Gallery on Saturday, 2 November. Todd and Hayley demonstrated wood texturing, bleaching and colouring techniques and their slides traced the progress of their professional development from early works to the most recent major exhibition pieces. An enthusiastic audience of twenty craftspeople attended the occasion. They are not only excited at the prospect of putting their new knowledge into practice but were encouraged by the opportunity to ask questions and discuss, one-on-one, their particular enthusiasms and concerns.

The give and take of energetic review and critique in the exchange of ideas is vital for the development of excellence in all cultural fields. designXchange wants to ensure Todd and Hayley's visit to the region is the precursor to visits by more of the world's leading artists and designer/makers in wood. Their presence will be a major stimulus to activity in this region. designXchange is not only dedicated to making it happen but also to nurturing new ideas that have their origin in the Great Southern and touch other parts of Australia and the world.

Dean Malcolm, 9845 2028, South Coast Wood Works Gallery
David Walker, 9848 1490, Denmark

Appendix 4: Focus Group Summary

Company	Use of professional designers	Knowledge, the market and the role of design	Collaboration and design
AQ2 Chris Speight	He disagrees that there is no trust and protection of ideas. Says that professional designers usually acknowledge copyright and IP issues when starting out a project Benefits in terms of their professionalism, understanding of design principles and ability to make something work. Act as a catalyst. Recognise that you are paying them for a service = they have value far beyond his initial expectations Argues that it is not just the skills, but the access to a network / library of other professionals and expertise you get in contact with The missing elements = look at more professional designers! Even his staff have lifted their design aptitude from exposure Much of the time we don't give them a big enough glimpse of what we are doing – if we are paying them $75 per hour, we should not hold back Need to get involved, to get something out of it	Wasting time if don't get ideas out there (about keep on thinking of protecting ideas with designers) We usually have to go for a niche market. That's our forte in the region Rich skills but constrained in terms of market size. That's the regional base working against us We need volume manufacturing to create the jobs Manufactured in the region but not entirely designed here (talking about his product)	We can't afford to just wait with the chicken and egg scenario. Collaboration may help Can we just start interactions in small steps and involve a designer? He can try to get in touch with a designer whom he works with in Perth – David Miller to do a brainstorming session?

Finewood & Landscape Design Bruce Thomas		What is quality design or product? It's important to see where everyone is coming from Inspiration from others and getting a different point of view	Recognition of designed product – between manufacturers and designers, who or how much ownership will each party have? His experience with collaborating with Coastal Stainless was to move on from models. Helped raised questions and makes you ask why? Suggestions for improvement and help generate other ideas and Using other materials To start the ball rolling…Need a framework of support of government or institutions, eg. financial, marketing, process, industry involvement A vision which is realistic and constructive with clear goals and objectives
Coastal Stainless Raphael van der Waag	Know the processes and to do the research necessary to execute the project A designer is not just an artist – a designer considers a whole range of factors when designing, while an artist usually does their art for reasons of self-expression		
South Coast Fabrications Neil O'Keefe	Lack of expertise in the region Really have to do it yourself Not enough work here to support services (Most people share this view too)		

South Coast Wood Works Gallery Dean Malcolm	Some of us who have an industrial design qualification choose to not practice it Culture of collaborating with designers in Italy is embedded (companies from Designing Futures said that design is a big part of their corporate budget, I think around 30%, while Australia spends an average of 3%!) Designers can creatively solve problems, they are trained to do so – they (industrial designers) have a grounding in a range of fundamental techniques and processes – they have the ability to source other knowledge into project	How do you get around it? Why not share the risks? What if we had more of an understanding of knowing each other's capabilities in the region to tap into? How do I become more viable as a business?	This is the reason why he is here, to see what can happen – to pursue ideas that he's got designXchange = issues on aesthetics, not that much technical issues Collaborating and discussing openly. For developing new ideas. Not just using timber Products to inspire the buyer to purchase, not to fill a need in the marketplace Process of thinking collaboratively about a single problem – extremely interesting possibilities can happen We need someone that is good at idea generation – Brainstorm, materials, techniques and ideas for a specific product?
Smith's Aluminium Jim Cann	Trust is an issue Don't know of any designers in the region (Most seem to agree with this) Have not had that luxury Can we get someone to come	Some massive barriers to overcome. There is definitely some under utilised capabilities in the region Must know more about product and materials, applying that knowledge. Need for product knowledge before R&D Market perception of the worth of the product BRANDING is the secret to the whole thing! Need to get mass produced products – in training terms, I have to get something that apprentices can work on to build up their skills and knowledge	Is this just another "think tank" exercise? Frustration with no objective Do we throw some money into the hat? Can we do something about it? Connections and creativity – to achieve something different It will be an exciting thing to get something out of this Who can facilitate this process? Is there a design institute in Perth to run these sessions?

Wilson Machinery Gary & Jean Wilson	Designers (designXchange group) are different – GSEnG are dealing with metals like steel, functionality of the product is important, while aesthetics is considered but does not play a leading role (Bruce disagrees with this and says that functionality is important, eg a cabinet design)	Often asked to do prototypes for other people, doesn't charge for consulting. Advice is usually on resolving key design issues that take up a substantial amount of time Believes you have to know what market you are serving first before going ahead to design any particular product No point developing a product where there will be no market, no matter how good the idea is Must source knowledge from other experts, outside your own field and from professionals trained in that particular field Lots of people have great ideas but don't have the social skills to carry it through	GSEnG and collaboration = change of attitude has been phenomenal for people who used to view themselves purely as competitors Without competition one can't survive, but there are benefits to use competition as a stepping stone, compete in own niche, but need a catalyst like a competitor to work with you to generate new areas I don't feel threatened as every buyer has different requirements, therefore every product has a chance of being sold Collaborating with like-minded people from a similar field…as every business has a different need
GSACC Vicki Brown	When I speak of designer to non-designer, its like talking about the "dark side" – there are some extreme reactions out there	Process is transferable isn't it (when there was argument of engineering design and product design being different – how people think differently)	It is about how we value add to existing and new products and processes, to increase the revenue base and jobs in the region Does it have economic benefit? Employment outcomes? Collaborating to expand the manufacturing base and the market Commonalities and differences