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The Application
of the Product Development Process
in the Development of Architectural Products



MASSEY
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The Application of the Product Development Process in the Development of Architectural Products

Abstract

Historically, methodologies in architecture and product development have differed with one based in art, the other in industry but their similarities are bringing them together. This research compares the Product Design, Product Development Process and Architectural Design Methodologies, showing the differences between them and how they are developing to common structures. Architectural design in the 1990s is presented as a multi-disciplinary solution for complex building systems, including purpose built products, and examples of European architectural firms who develop products with manufacturers are presented.

Opportunity exists in New Zealand for product development to be utilised in architectural projects. A project investigated the design, development and production of an architectural product in New Zealand, where a combined Product Design and Development Process was integrated with Architectural Design. This was the design and development of a trolley system for the new Palmerston North Library.

The Product Development and Architectural Processes need to be interrelated for a total design approach in development projects to produce and market products. This requires a greater emphasis on the inclusion of end user involvement in the building up of ideas and evaluation procedures throughout the development process. Also needed is a better understanding of manufacturing processes and product development. This integration of the Product Development Process including final marketing with architectural design can be achieved by forming multi-disciplinary teams or networking with other professionals for example manufacturing engineers and consumer researchers. This integration should produce marketable products. The research concludes that Product Development is an effective method for designing architectural products in New Zealand for the local market and for export.

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Introduction

In a society changing continually with technology as an active ingredient, environments are required to be flexible and interactive. The main drive for this has been the transfer from an industrial age through an electronic revolution to what is termed the 'Second Machine Age' (also known as the Information Age). Just as the robot has revolutionised the processes of production, the computer has altered the way most of the western world operates. The First Machine Age meant struggling to reconcile the art and craft of architecture with the new machinery of industrial production. Most early Modernists were concerned mainly with the new style rather than understanding industrialised production methods.

The Second Machine Age can be associated with the introduction of the television, but more so of the computer. The microprocessor has allowed modern industry to provide benefits for the masses especially in the areas of consumer goods, automobiles, and communications, by flexible mass-production lines. Buildings of the Second Machine Age are complex systems that contain complex subsystems made of many mass produced products such as ducting, electrical, heating and computer controlled lighting systems. These truly 'smart buildings' are technology based and require a multi-disciplinary approach in their creation.

The methodologies of architecture and product development have differed, but despite this, architectural practices often design products for their buildings. Some of the reasons for this include: a complete design service to the client; control of service and design; the

unavailability of the required goods; local production quota restrictions; budget; lead times; and monetary gains.

In public and commercial spaces, products such as lighting, furniture, shelving and carpets have substantial budgets and involve a large proportion of the research and development in their production, but are typically designed on a job-by-job basis. In this situation, many practices fail to realise the potential in design for sustainable manufacture, and produce 'one off' designs that ideally should be, or could be mass produced. However, there are several architectural firms that design and produce one-offs for a particular job that then become mainstream products. They achieve this through the use of multi-disciplinary teams, and a structured research and development programme with a manufacturer.

This thesis investigates why and how the Product Development process could be utilised in the development of architectural products. Chapter One studies the historical development of product development and architectural and product design.

Product Development is part of a company's business strategy to launch new and improved products onto the market. The Product Development Process is a multi-disciplined co-ordinated project that is undertaken to meet the company's strategic goals including marketing, business and technology plans

Product Design forms part of this project and consists of the product design specification (or 'product concept') development through to the

testing of the final prototype. Professionals, namely product and industrial designers, model-makers, technologists and engineers are closely involved in the total project and consider the consumer as well as the manufacturing requirements in the Design Process.

Architectural Product Design encompasses the design and development of products for architectural environments. These products may be developments in building materials and finishes, or any item in an interior. In this context architectural products offer a large area of potential for product and industrial designers to exploit, using a structured development process. This is especially the case in New Zealand where: overseas lead times can be extremely long; quotas¹ exist for public and government interiors; architects specify overseas products because they regard New Zealand made products substandard. This country has the primary resources and skill base to produce value added architectural products.

There is a need to compare Product Design and Architectural Methods to see if they can be integrated for use in an architectural context for a total design approach. Cooper(1983) reviewed the uptake of the Product Development Process and its success within the manufacturing sector, but within architecture there has been little research to date. Abel(1986) in *Ditching the dinosaur sanctuary* suggested architects become more aware of industrial design practices and manufacturing processes.

¹ A quota of 70% New Zealand content exists for publicly funded projects. This is to limit import of product and give local firms an opportunity.

Within the Architectural industry there are very few examples of firms who have Research and Development programmes in place as part of their strategic goals. The architectural practices of Norman Foster and Associates, and Richard Rogers + Partners are the major exceptions. They employ industrial and product designers, other specialists when required, and work closely with engineers and manufacturers to develop products. Examples of their product work is presented and discussed in Chapter Two.

The design and development of a library trolley system was selected as a project to validate Architectural projects using product development methods in practice within New Zealand. This project was undertaken by the researcher, in conjunction with, Athfield Architects of Wellington, for the Palmerston North City Council library, and was completed in May 1996.

The objectives for this thesis were:

- To compare Architectural, Product Design and Product Development Methodologies.
- To investigate the historical development and compare the differences between the Product Development Process and Architectural Design Methodologies.
- To study architectural firms that have integrated development methods within their Architectural methodology and design philosophy.
- To undertake an integrated method of product development for an architectural product within an architectural environment in New Zealand by:

- Recording the actual process used in the development process and;
 - Recording the decision making process and ascertain how it affects the development process.
- To investigate and confirm that a systematic and structured process can be overlaid on the architectural design process with a user focus.

It must be noted that the aim was not to come up with a new methodology: but to prove that an understanding of the processes and their manipulation, can lead to more efficient building projects, as well as successful commercial products. No attempt is made in this paper to define "good design" as the work presented is concerned with the theory of navigating towards a final product rather than with the merit of that product, although it should be stated that an efficient process should lead to a better end product. The mere fact that the firms presented in Chapter Two have produced key buildings in Europe and have won countless awards for their work, perhaps is an indication that their process and philosophies are on the road to providing society with more efficient and customer orientated environments and the building industry with a progressive project method.