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**AN EXPLORATION OF  
THE PRE-DEVELOPMENT PHASE OF  
NEW PRODUCT DEVELOPMENT  
IN NEW ZEALAND MANUFACTURING SMALL  
AND MEDIUM ENTERPRISES**

**A thesis presented in partial fulfilment of the requirements  
for the degree of Master of Engineering in Product Development  
at Massey University, Auckland, New Zealand.**

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2008**



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## **Abstract**

Developing successful new products in New Zealand Small and Medium Enterprises (SMEs) is difficult due to several factors. These include greater expectations, new technology, reduced product lifecycles, high project failure rates, and the pressures from competition. This presents a significant challenge for a product development team as it leaves companies searching for opportunities to gain an advantage in the market place.

The low level of research performed in relation to SMEs over the past number of years, especially in the field of New Product Development (NPD), has resulted in an increase in interest by practitioners and academics.

This research was aimed at exploring the pre-development phase currently employed by SMEs within the New Zealand manufacturing industry. The purpose was to gauge the understanding and importance of this early stage in NPD amongst practitioners from these SMEs, as the literature highlighted this as an area of weakness requiring empirical research. Specifically, the objectives set for this research investigation were to survey manufacturing SMEs in New Zealand, compare the findings with past and current research on a national and international level, and make conclusions in relation to:

- The nature and complexity of the pre-development activities performed by New Zealand manufacturing SMEs.
- The difficulties and/or limitations New Zealand manufacturing SMEs encounter whilst implementing the pre-development activities.
- The importance of and attitude towards the pre-development phase with regards to the overall NPD process and the company's product development efforts.

The study consisted of a questionnaire survey, run during June and July 2007 with twenty-two SMEs representing the light engineering/manufacturing, electronics, and food industry sectors. The questionnaire survey was followed up with one-on-one interviews with some of the participating companies allowing for both quantitative and qualitative data to be obtained.

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The research investigation found that the difficulties in carrying out the five pre-development activities studied were common, compounded by the lack of skills in-house to do so. Of the five pre-development activities studied, the preliminary technical analysis was found to be given the most attention by the companies with regard to overall project time, with lesser emphasis placed on the other four activities. Many of the companies developed 'new to the world' products or entered new markets with existing products where they primarily took part in the business-to-business market. Good relationships existed between the manufacturing SMEs and their suppliers, distributors and customers.

Management were found to have a high level of involvement in product planning, as they tend to be involved in key decision making in NPD in SMEs. Many of the companies had difficulty when it came to identifying opportunities and customer needs, with the addition of numerous barriers limiting the implementation of NPD. The greatest difficulties arose during the practical implementation of tools and techniques due to several challenges, such as limited budgets, lack of time and resources as well as incompatibility within the existing company culture.

Clearly, the pre-development phase is the basis for the remainder of the NPD process with essential development decisions being made here. This phase is therefore crucial in determining the likely outcome of NPD projects. The research findings suggested that greater consideration and effort should be placed on the pre-development phase, even more so with the cost increasing exponentially when mistakes are made later in development. The study highlighted the need to improve the tools and techniques available for use during the pre-development phase, as companies are aware of its importance but find it the most difficult to undertake. High new product failure rates; over-expenditure of project time; lack of awareness, commitment, and formality; and the high level of difficulty experienced by the New Zealand SMEs studied, suggests there is a need for the implementation of better tools and techniques during the pre-development phase to aid successful NPD in New Zealand manufacturing SMEs.

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## **Publications**

A research paper, co-authored by Dr. Aruna Shekar, based on this research study was submitted and accepted into the Industrial Engineering and Engineering Management (IEEM) 2008 Conference held in Singapore during the month of December, 2008. The paper will be presented at the Conference as well as being publicised in the Conference proceedings. A copy of this research paper is included in Appendix I.

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## Table of Contents

<b>Abstract</b> .....	<b>iii</b>
<b>Acknowledgements</b> .....	<b>v</b>
<b>Publications</b> .....	<b>vi</b>
<b>Table of Contents</b> .....	<b>vii</b>
<b>Definitions</b> .....	<b>x</b>
<b>List of Tables</b> .....	<b>xi</b>
<b>List of Figures</b> .....	<b>xi</b>
<b>Chapter 1: Introduction</b> .....	<b>1</b>
<b>1.1. Introduction</b> .....	<b>2</b>
<b>1.2. Research Objectives and Questions</b> .....	<b>5</b>
<b>1.3. Research Limitations</b> .....	<b>6</b>
<b>1.4. Expected Outcomes</b> .....	<b>7</b>
<b>1.5. Thesis Structure</b> .....	<b>8</b>
<b>Chapter 2: Literature Review</b> .....	<b>9</b>
<b>2.1. Review of New Product Development</b> .....	<b>10</b>
2.1.1. New Product Development Defined .....	10
2.1.2. The Process of New Product Development.....	11
2.1.3. The Pre-Development Phase of NPD.....	13
2.1.3.1. The Front End of NPD Defined .....	14
2.1.3.2. Pre-development Activities.....	15
2.1.3.3. The Importance of the Pre-development Phase.....	16
2.1.4. Difficulties Implementing NPD.....	18
<b>2.2. Review of Small and Medium Enterprises</b> .....	<b>20</b>
2.2.1. Small and Medium Enterprises Defined .....	20
2.2.2. Small and Medium Enterprises.....	21
2.2.3. New Product Development in SMEs .....	22
<b>2.3. SMEs, NPD, and the Pre-development Phase in New Zealand</b> .....	<b>25</b>
<b>2.4. Restatement of Research Questions</b> .....	<b>28</b>
<b>Chapter 3: Research Methodology</b> .....	<b>29</b>
<b>3.1. Introduction</b> .....	<b>30</b>
<b>3.2. The Sample</b> .....	<b>31</b>
3.2.1. Sample Selection.....	31



---

3.2.2. Validity of Sample .....	31
<b>3.3. Ethical Issues.....</b>	<b>33</b>
<b>3.4. The Questionnaire Survey .....</b>	<b>35</b>
3.4.1. Development of the Questionnaire Survey.....	35
3.4.2. Trial Run and Running of the Questionnaire Survey .....	37
3.4.3. Interview Sessions.....	38
<b>3.5. Data Analysis and Tools .....</b>	<b>39</b>
<b>Chapter 4: Research Findings .....</b>	<b>40</b>
<b>4.1. Introduction .....</b>	<b>41</b>
<b>4.2. General Information.....</b>	<b>42</b>
4.2.1. Enterprise Size and Years Operating.....	42
4.2.2. Years in Business .....	42
4.2.3. Industry Sector .....	44
4.2.4. Market Served .....	45
4.2.5. Annual Sales .....	45
4.2.6. Staff Background .....	46
4.2.7. Relationship with Distributors, Suppliers and Customers.....	47
4.2.8. Core Benefits of Product Range.....	48
<b>4.3. New Product Development .....</b>	<b>50</b>
4.3.1. Product Planning Responsibility.....	50
4.3.2. Initiation of Product Development.....	51
4.3.3. Product Development Processes .....	52
4.3.4. Formality of Product Development Process .....	54
4.3.5. Communication within Teams .....	55
4.3.6. New Products and New Product Features .....	56
4.3.7. Market and Technical Related Criteria.....	57
4.3.8. Product Development Advice .....	58
4.3.9. Balance between Engineering/R&D and Marketing.....	59
4.3.10. Products Commercialised Over Past Five Years .....	61
4.3.11. NPD Program Objectives and Success.....	61
<b>4.4. Pre-development .....</b>	<b>64</b>
4.4.1. Relevance of Pre-development Activities .....	64
4.4.2. Time Spent on the Pre-development Phase .....	65
4.4.3. Use of the Pre-development Activities.....	66
4.4.4. Product Development Uncertainty.....	68
4.4.5. Degree of Difficulty .....	69
4.4.6. Generation of New Product Ideas .....	70
4.4.7. Pre-development Techniques.....	72
4.4.8. Effectiveness of Pre-development Phase.....	73
4.4.9. Barriers Preventing the Use of NPD Tools/Techniques.....	74
<b>4.5. Summary of Research Findings .....</b>	<b>76</b>
<b>Chapter 5: Conclusions and Recommendations .....</b>	<b>78</b>

---

<b>5.1. Conclusions and Recommendations .....</b>	<b>79</b>
<b>5.2. Future Research .....</b>	<b>84</b>
<b>Bibliography .....</b>	<b>85</b>
<b>Appendices .....</b>	<b>91</b>

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## Definitions

***Pre-development Phase, Front End (FE), Pre-phase 0, Pre-project Activities:*** “The messy ‘getting started’ period of product development. Preceding the more formal product development process, it generally consists of three tasks: strategic planning, concept generation, and, especially, pre-technical evaluation. These activities are often chaotic, unpredictable, and unstructured. In comparison, the subsequent new product development process is typically structured, predictable, and formal, with prescribed sets of activities, questions to be answered, and decisions to be made” (Belliveau et al., 2002, p.444).

***New Product Development (NPD), Product Development (PD):*** “The overall process of strategy, organization, concept generation, product and marketing plan creation and evaluation, and commercialization of a new product. Also frequently referred to just as ‘product development’” (Belliveau et al., 2002, p. 450).

***Small and Medium size Enterprise (SME):*** There is no official definition of an SME in New Zealand. However, according to Organization for Economic Co-operation and Development (*The OECD small and medium enterprise outlook*, 2000) they are considered to:

- Involve personal ownership and management
- Have few or no specialist managerial staff
- Be no part of a large business enterprise

In addition to the above, Cameron and Massey (1999) and the Ministry of Economic Development (2007) define a SME as an enterprise employing between zero and 99 employees whereas of February 2006, SMEs made up 99.4 percent of New Zealand enterprises (*SMEs in New Zealand: structure and dynamics*, 2007).

***New Zealand Manufacturing Industry:*** Companies within the New Zealand manufacturing and production industry have been defined by Statistics New Zealand (2007) as: those producing “goods from raw materials or assembles products from components. It supplies the domestic and international markets and some specialist niche markets”.

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## List of Tables

TABLE 2-1:	Activities included in the pre-development phase (Cooper & Kleinschmidt, 1986; Ho, 2001; Kerr, 1994; Khurana & Rosenthal, 1998).....	16
TABLE 2-2:	International definitions of enterprises in terms of number of employees (adapted from Cameron & Massey, 1999; adapted from Gawith, Grigg, Shekar, & Anderson, 2007; adapted from <i>SMEs in New Zealand: structure and dynamics</i> , 2007).....	20
TABLE 3-1:	Ethical principles observed throughout the duration of the research project (adapted from Massey University Human Ethics Committee, 2006).....	33
TABLE 4-1:	Definitions of industry sectors represented (adopted from Statistics New Zealand, 2007).....	44
TABLE 4-2:	Breakdown of enterprises size, mean years operating and industry sector.....	45
TABLE 4-3:	Market served by the participating SMEs.....	45
TABLE 4-4:	Annual sales generated by New Zealand manufacturing SMEs.....	46
TABLE 4-5:	Core benefits of main product range based on.....	48
TABLE 4-6:	Departments initiating NPD by enterprise size.....	51
TABLE 4-7:	Formality of NPD process by department initiating NPD.....	52
TABLE 4-8:	NPD process models used by current research investigation participants.....	52
TABLE 4-9:	Importance of market related criteria.....	57
TABLE 4-10:	Sources of NPD advice.....	58
TABLE 4-11:	Balance between dominant departments and industry sector.....	60
TABLE 4-12:	Mean number of products commercialised.....	61
TABLE 4-13:	The degree of difficulty associated with opportunities and customer needs.....	69
TABLE 4-14:	Generation and screening of ideas through the use of inter-disciplinary teams.....	71
TABLE 4-15:	The effectiveness of the pre-development phase.....	73
TABLE 4-16:	Barriers preventing the use of NPD tools and techniques.....	74

## List of Figures

FIGURE 2-1:	Example of a generic product development process (Belliveau et al., 2002).....	12
FIGURE 2-2:	Characteristics of change during NPD (Herstatt, 2000; Rainey, 2005; Smith & Reinertsen, 1998).....	13
FIGURE 4-1:	Participating enterprises categorised by number of employees.....	42
FIGURE 4-2:	Number of SMEs versus years in business.....	43
FIGURE 4-3:	Employee backgrounds according to enterprise size.....	47
FIGURE 4-4:	Responsibility for product planning.....	50
FIGURE 4-5:	Performance objectives and success of product development program.....	62
FIGURE 4-6:	Comparison of the perceived relevance of the pre-development activities.....	64
FIGURE 4-7:	Comparison of average pre-development times (adapted from Smith & Reinertsen, 1998).....	66

---

FIGURE 4-8:	Comparison of the pre-development activities with past research.....	67
FIGURE 4-9:	Market and technology uncertainty for New Zealand manufacturing SMEs.....	68
FIGURE 4-10:	Use of pre-development techniques.....	72