An Empirical Study of Important Dimensions of New Product Development Practices in Small to Medium Enterprises in New Zealand

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EXECUTIVE SUMMARY

The New Zealand innovation sector is dominated by Small to Medium Enterprises (SMEs). SMEs make up more than 97% of all businesses and account for about 30% of total employment. There is, however, limited research available on the New Product Development practices of these companies. For New Zealand to compete with major economies of the world, investment in innovation is paramount. This can be achieved by effective management of New Product Development practices and systems.

This report presents findings of the research based on the “Establishing an NPD best practices framework” survey which was designed to conduct similar studies in the US, UK and Ireland (Kahn, Barczak and Moss 2006). The study identified seven dimensions of New Product Development practices – strategy, process, research, project climate, company culture, metrics & performance measurement and commercialisation. The survey was designed to measure the relative importance of each of the seven dimensions. The survey further listed various characteristics under each of the seven dimensions and respondents were asked to identify which of these constituted poor, good, better and best practices.

Strategy was ranked the highest among the seven dimensions followed by commercialisation, research, company culture, process, project climate and metrics. The results were broadly consistent with those from the US, UK and Ireland which ranked strategy the highest and metrics the lowest. Commercialisation was ranked the second most important dimension where as in the US, UK and Ireland studies, research was ranked above commercialisation.

Respondents indicated that a formal strategy helped reduce processing time. Decisions were taken quickly because the head of the firm was directly involved in the product development process. A vision statement for the company which

incorporates NPD was also cited as an important part of the overall NPD strategy. This includes “well-defined NPD goals and long-term strategic support for NPD projects”.

The study also considered the characteristics of the seven dimensions of NPD. Respondents were asked to review those characteristics and indicate whether they reflected a Poor, Good, Better or Best NPD practice. The US, UK and Ireland samples indicated that poor practices were more well-known than best practices were each of the seven dimensions. There was one significant difference between NZ results and those from the US, UK and Ireland. NZ professionals identified best practices for the Metrics dimension. This indicated that even though Metrics as a dimension ranked the lowest among the seven for NZ professionals, there was a general awareness of the characteristics that constitute best and poor practices for this dimension.

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CHAPTER 1

3. INTRODUCTION

3.1 Product Development

Product Development is a complex process. Quite often, it is considered risky. But for companies that have a robust process in place, it can be very rewarding. Product development is basically the process of bringing a product or service to the market. To grow, a company must continue to learn (research) and to make a difference in its industry (pioneer). Business, whether it sells waste management or interstellar communications, janitorial services or gene-splicing, lives through new growth—not through clones of the past (Gruenwald 1995).

A Product Development cycle generally consists of idea generation, market research and analysis, design and development, testing and commercialization. These are applicable to both product-oriented and service-oriented companies. Most of the companies follow some or all of the above steps during their Product Development process. What separates “the Best” from “the Rest” however is, the ability to develop and implement a systematic process of New Product Development. “The Best” are those companies that follow a diligent NPD process and have systems in place to cover any eventuality. Product Development should always be proactive rather than reactive. “The Best” always anticipate the need for new products rather than respond to changes in the market. This is achieved by having a robust process in place.

The need for lean, rapid and profitable new product development has never been greater. Product life cycles are shorter, competition is more intense and customers are more demanding. Companies that fail to innovate face a grim future. The problem is that winning with new products is not easy. An estimated 46% of the resources that companies devote to the conception, development and launch of new products go to projects that do not succeed - they fail in the

marketplace or never make it to market (Product Development Institute Inc website).

Companies need to constantly innovate to increase their productivity and market share. However, there is no guarantee that all new products introduced to the market succeed. Majority of the new products fail to succeed or do not even make it to the market. In such a scenario, where the success and failure of a company rests on its ability to innovate, an effective Product Development process is vital for new product success.

3.2 New Product Development in New Zealand

The innovation sector in New Zealand is dominated by Small to Medium enterprises. Product Development requires considerable investment of time and money. This may lead to many in the industry cutting corners when it comes to implementing a NPD process.

New Zealand is very small compared to the big economies like US and Japan and emerging economic powerhouses like China and India. While it is difficult to compete with relatively cheap manufacturing and service oriented economies like China and India, there is a case to carve a niche identity as an innovator. Perhaps there has never been a greater need to invest more in innovation. This can be achieved to a great extent by the effective management of Product Development processes and systems.

3.3 Seven Dimensions of NPD

The PDMA (Product Development Management Association) has been carrying out a study on Best Practices among companies in the United States of America for well over a decade now. The reports generally focus on trends in New Product Development and try to separate “The Best” from “The Rest”. This report focuses on the NPD Best Practices of small to medium enterprises in New Zealand. Similar studies have been conducted in the US, UK and Ireland. Given

the size of firms in Ireland, they should compare favourably with those in New Zealand. The study looks at the seven dimensions of NPD and the relative importance of these dimensions.

The seven dimensions of NPD practice as described by Kahn, Barczak and Moss (2006) were identified as

- **Strategy**: the defining and planning of a vision and focus for research and development, technology management, and NPD efforts
- **Process:** the implementation of NPD stages and gates for moving products from concept to launch
- **Research**: the application of methodologies and techniques to sense, learn about, and understand customers, competitors, and macro-environmental forces in the marketplace
- **Project Climate**: the means and ways that underlie and establish NPD intra-company integration at the individual and team levels
- **Company Culture**: the company management value system driving NPD thinking
- **Process, Metrics & Performance Measurement**: the measurement, tracking, and reporting of NPD project and NPD program performance
- **Commercialization**: activities related to the marketing, launch, and post-launch management of new products.

CHAPTER 2

4. LITERATURE REVIEW OF PRODUCT DEVELOPMENT PRACTICES

4.1 New Product Development

The literature in the field of product development practices is very extensive. But in New Zealand, studies published in this area are very scarce.

Product development is the set of activities beginning with the perception of a market opportunity and ending in the production, sale and delivery of a product. The economic success of manufacturing firms depends on their ability to identify the needs of customers and to quickly create products that meet these needs and can be produced at low cost (Ulrich & Eppinger, 2004).

To be successful at product innovation, a company needs to have a process in place. The 2003-04 PDMA report on Best Practices among US companies reported that the "Best-Rest" gap in NPD has widened. The study revealed that "the best" performers in new product development generated 47.6 percent of sales and 49.1 in profits from new products – more than twice as much as "the rest". The results are an indication that the best invest substantially in a formal NPD process. The number one success factor is a unique superior product – a differentiated product that delivers unique benefits and superior value to the customer (Cooper 2001). The article also stated that "truly unique and superior products" proved to be 98 percent successful compared to just an 18 percent success rate for "me-too products".

Having a new product strategy for the business is clearly linked to positive performance (Cooper 2003).

Various NPD processes have been described over the years. The review attempts to focus on some of the more definitive NPD processes and those that are considered relevant to this research.

4.2 Product Development processes

4.2.1 Cooper's Stage-Gate Process

Figure 1: Stage-Gate® Process (Cooper)

A typical Stage-Gate process is pictured above. A Stage-Gate process is a conceptual and operational roadmap for moving a new-product project from idea to launch. Stage-Gate divides the effort into distinct stages separated by management decision gates. Cross-functional teams must successfully complete a prescribed set of related cross-functional tasks in each stage prior to obtaining management approval to proceed to the next stage of product development. (Stage-Gate online)

According to a Product Development & Management Association (PDMA) best-practices study, 68 percent of U.S. product developers now use some type of stage-gate process (A. Griffin, The 1997 PDMA Report).

4.2.2 Generic Product Development Process

The generic product development process consists of six phases:

1. Planning
2. Concept development
3. System-level design
4. Detail design

5. Testing and refinement
6. Production ramp-up

The process begins with a planning phase, which is the link to advanced research and technology development activities. The output of the planning phase is the project's mission statement, which is the input required to begin the concept development phase and which serves as a guide to the development team. The conclusion of the product development process is the product launch, at which time the product becomes available for purchase in the market place. (Ulrich & Eppinger 2004)

4.2.3 Fuzzy Front End and NPD

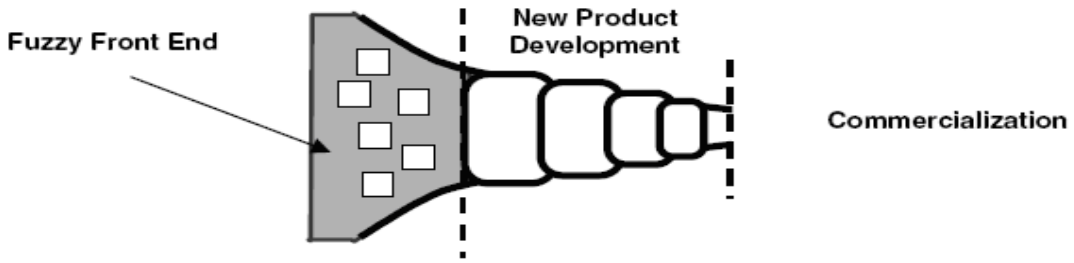

Figure 2: Innovation Process (Koen et al.)

Koen et al. (2002) describe the innovation process as consisting of three areas: the fuzzy front end (FFE), the new product development (NPD) process, and commercialization. The first part – the FFE – is generally regarded as one of the greatest opportunities for improvement of the overall innovation process. Lack of research in to best practices made the FFE one of the most promising ways to improve the innovation process. The division between the FFE and the NPD is often less than sharp, since technology development activities may need to be pursued at the intersection.

4.2.4 Technology Stage-Gate Process

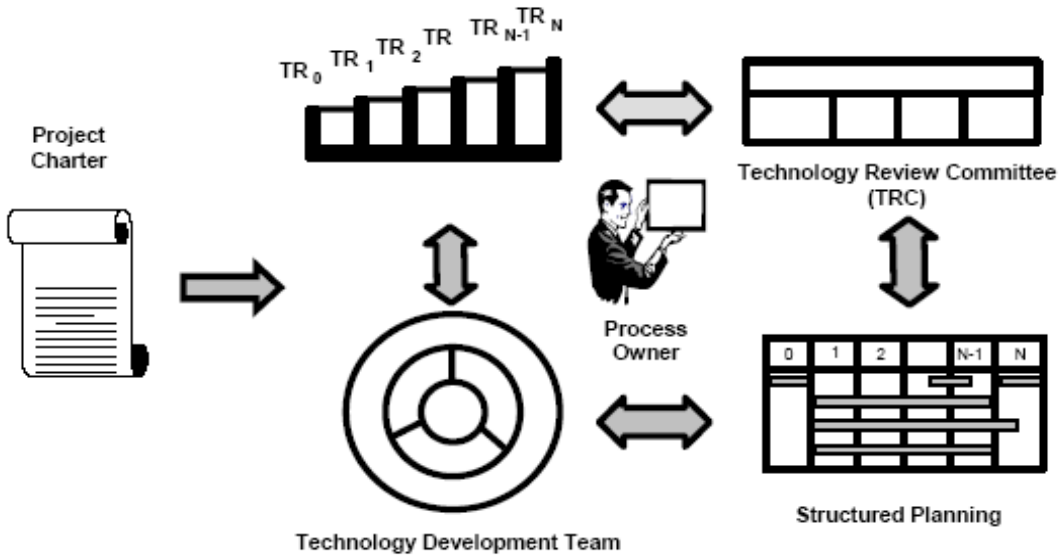

Figure 3: Technology Stage-Gate Process (Ajmian et al.)

Ajamian et.al (2002) stated that the technology Stage-Gate (TechSG) process is needed to manage technology development efforts when there is high uncertainty and risk. TechSG lies between the Fuzzy Front End and the traditional Stage-Gate process. The overall purpose of the TechSG process is to bring both scientific and business rigour into the technology discovery process, to better select and allocate resources to high-risk projects, and to reduce technology development times.

4.3 Product Development Strategy

Strategy plays an important role in the fuzzy front end of a product development process. Galavan et al. (2008) stated that strategic planning in the fuzzy front end of product development enables commercial success. An effective strategy answers the following questions: Who are customers for a product based on this idea? Why will they buy a product based on our idea? Are we doing the right things, when developing this idea, to create value for desirable customers and to capture value for our business unit?''.

Clark and Wheelwright (1992) state that the ability to identify opportunities, mount the requisite development effort, and bring to market new products and processes quickly and efficiently is critical to effective competition. The typical phases of Product Development are identified as concept development, product planning, product/process engineering and pilot production/ramp-up. Koen (2005) states that Product Development needs to begin with a well-defined vision, which leads to an innovation strategy, which in turn, defines the product and platform strategy.

O'Connor (2005) defines three basic components to any NPD framework: the decision flow, the workflow, and supporting systems and practices. An understanding of all three components is essential to carry out processes effectively. A company, according to O'Connor needs to have a separate NPD process for each business unit. Guedes (2000) concluded that human resources can be used as a source of market information and product development in SMEs. They can also be lead to initiate a change in firms from product to market oriented strategies.

A formal NPD strategy can help address product development delays by forcing senior executives to articulate the strategic role of their NPD programs. The creation of a strategic vision for the firm's NPD program can help ensure that NPD efforts receive sufficient resources within the firm. In addition, by establishing the criteria to be used for prioritizing projects and allocating resources, a formal NPD strategy can help reduce conflict among key stakeholders in NPD and facilitate the process of product definition (Parry et al. 2009).

4.3.1 Product Development Research

Cooper and Edgett (2006) stated that too many new-product projects move from the idea stage right into development with little or no up-front homework. The results of this "ready, fire, aim" approach are usually disastrous. Solid pre-

development homework drives up success rates significantly. Sadly, firms devote very little of a project's funding and person-days to these critical activities.

More time and resources should be devoted to the activities that precede the design and development of the product. Up-front homework means undertaking thorough market and competitive analysis, research on the customers' needs and wants, concept testing, and technical and operations feasibility assessments. All of these activities in turn lead to the preparation of a full business case prior to beginning serious development work (Cooper and Edgett 2006).

We believe that research in product development must be tightly motivated by the needs of industrial practice. This is because product development is essentially a commercial function, and therefore most knowledge about product development does not have much meaning outside of the commercial realm. The models employed in product development research are at best coarse approximations of the phenomena under study, unlike in the physical sciences where the language of mathematics seems to map in a remarkable way to the physical world. We believe that this loose connection between models and practice implies that the product development research community could benefit from stronger adherence to the scientific method, and proceed only a short distance ahead of empirical validation, lest energy be wasted on understanding models with little relevance to the motivating questions (Krishnan & Ulrich 2001).

4.3.2 Project Climate

In the context of organisational processes, climate plays the part of an intervening variable which affects the results of the operations of the organisation. The climate has this moderating power because it influences organisational processes such as problem solving, decision making, communication, coordination, controlling, and psychological processes of learning, creating, motivation and commitment. Climate exerts a strong influence on outcomes such as high or low quality of products or services, radically new

products or only small improvements in the old ones, high or low well-being among employees, and commercial profit or loss (Ekvall 1996).

Senior managers in top performing businesses create a positive climate and culture for innovation and entrepreneurship, foster effective cross-functional new product project teams, and are themselves properly engaged in the product innovation decision making process (Cooper and Edgett 2009).

4.3.3 Company Culture

To understand the role that corporate culture plays in new product development, Spanjol et al (2009) surveyed 182 managers from companies in the consumer packaged goods industry. The research investigated how the different types of strategic orientation (i.e., customer, competitor, and technology orientations) influenced the front end of innovation. Specifically, this research examined how strategic orientation related to new product ideation outcomes such as ideation volume (i.e., how many new product ideas are generated) and ideation novelty (i.e., how innovative ideas are). The model developed in this study included both direct effects of strategic orientation on new product ideation and indirect effects on ideation, mediated by an organization's market search behavior targeted at uncovering new product ideas. The paper concluded that a company’s culture determines how it approaches new product development. To encourage fresh innovations, firms must dedicate resources to the exploration of new technologies. However, if the goal is to reduce risk and make incremental improvements to existing products, a competitor-focused or consumer-centric approach is best.

Cooper and Kleinschmidt (1995) propose that a company's overall new product performance depends on the following elements: the NPD process and the specific activities within this process; the organization of the NPD program; the firm's NPD strategy; the firm's culture and climate for innovation; and senior management commitment to NPD.

4.3.4 Metrics & Performance Measurement

The objective of performance measurement has changed over the past few decades. Traditional performance measures based on productivity are no longer appropriate or representative of the information needs of today's competitive global market (Ghalayini et al 1996).

Melnyk et al (2004) stated that metrics provided essential links between strategy, execution, and ultimate value creation. Changing competitive dynamics have placed heavy demands on conventional metrics systems, and created stresses throughout firms and their supply chains. According to Melnyk et al, Metrics provide three basic functions:

- Control – enable managers and workers to evaluate and control the performance of the resources for which they are responsible.
- Communication – metrics communicate performance not only to internal workers and managers for purposes of control, but to external stakeholders for other purposes as well.
- Improvement – metrics identify gaps (between performance and expectation) that ideally point the way for intervention and improvement.

The authors further state that research has not kept pace with these new demands in an environment where it was no longer sufficient to simply let metrics evolve over time but we must learn how to proactively design and manage them.

What exactly is 'performance measurement?' It has three meanings, listed here in order of increasing sophistication. First, it can imply a specific performance measure (i.e., an actual, definable metric). Second, it can mean the process of measurement (i.e., the systems and organizational processes for going about measuring performance). Third, it can indicate an essential aspect of a comprehensive strategic planning process (i.e., the management process of setting appropriate performance targets and evaluating their achievement to validate or revise the organization's strategy). The richest consideration of

performance measurement must include all three of these definitions (Tatikonda 2008).

4.3.5 Commercialisation

The last phase of the product innovation process is called commercialisation or launch (Guiltinan 1999, Crawford & Di Benedetto, 2003). Commercialisation is often understood to be the final phase of the innovation process: fuzzy front end, the new product development process, and commercialisation (Luoma et al 2008). The commercialization or product launch phase actually determines the destiny of a product (Beard & Easingwood, 1996). Di Benedetto (1999) stated that the commercialisation phase is especially important due to financial commitments that are often the most costly part of the new product programme. The fact that most of the new product development costs are determined by the decisions made at the front end phase, but they are realised at the commercialisation phase, would suggest a strong link between the front end and commercialisation phases (Luoma et al 2008).

The economic benefits of a new innovation are never fully realised until the innovation is actually introduced to market (Narayanan 2000). In spite of this, commercialisation is often a poorly managed phase (Luoma et al 2008). Cooper et al. (2005) states that a strong market orientation in new product development is critical to success, and that it is missing in the majority of companies' new product development projects. In their study, Luoma et al (2008) found that the front end and commercialisation phases of innovation process are strongly linked through questions critical to both phases and through personnel involved with both processes. The questions are related to seven categories: market need, market environment, technology, idea / value proposition, business environment, management and collaboration network.

Successful marketing of inventions and technology means to marry a new invention to a real existing need. It demands an extensive and very close collaboration and cooperation between three groups of people: those who create

inventions and technology, those who explore and create markets and those who use inventions and technology. Commercialization planning is appropriate for sorting and prioritizing research results. It facilitates engineering applications analysis by bringing industry and market issues into the decision-making process early (WIPO 1997).

4.4 Study of Best Practices in New Product Development

4.4.1 Best Practices – Definition

What is a best practice? It can be defined as a technique, method, process or activity that is more effective at delivering a particular outcome than any other technique, method, process or activity. Having a product innovation and technology strategy is clearly identified as a best practice. Best performers tend to have such practices in place to guide new product development efforts (Cooper et al. 2004).

4.4.2 The Best vs. the Rest

There have been a number of studies which draw on the differences between the Best and the Rest in their NPD practices. The following were considered relevant to this research.

Trends and Drivers of Success in NPD Practices: Results of the 2003 PDMA Best Practices Study (Barczak et al. 2003)

The Product Development and Management Association (PDMA) conducted its third study of Best Practices in New Product Development (NPD) in 2003. New product success rates continued to remain stable. Since the first study in 1990, about 59% of new products commercialized had been considered ‘‘successful,’’ however the firm defined that term. Consistent with the second 1995 study results, 54% of commercialized new products were successful from a profit perspective. A declining trend, however, was observed with regard to the percentage of sales and profits accounted for by new products. Only 28% of

sales and profits came from new products compared with 32% and 30%, respectively, in 1995.

A total of 74% of respondents reported that they had a specific new product strategy to guide product development efforts. NPD was most frequently led by a project leader formally appointed by management. Only about 60% of the ideas selected for advancement into the NPD process were selected using a formal process—the remaining moved forward through some informal advancement mechanism, and about half of those had no budget allocated to move them forward. New products were found to be contributing a lower percentage of revenues and profits than previously measured.

Table 1 below shows the Best versus the Rest success rates for sales and profits from new products and ideas. As with previous studies, the Best continued to enjoy more success across multiple performance measures compared to the Rest. (Barczak et al. 2003)

	The Best	The Rest
Number of Firms	96 (24)	303 (76)
Successes	75.5%	53.8%
Successes-Profits	72.4%	47.9%
Sales from New Products	47.6%	21.4%
Profits from New Products	49.1%	21.2%
Number of Ideas for One Success	4.0	9.2

Table 1: Best versus the Rest - Success Rates (2003 PDMA Study)

The study also states that "*the PDMA best practices research still has not been able to supply clues, let alone answers, on how to organize most effectively for NPD and how best to lead projects. Clearly, this area of research is in need of attention—or maybe there is just 'no one best way,' which in and of itself could be an important finding*."

The above assessment on there being ‘no one best way’ of effectively organizing NPD holds true in the context of this research. Some of the feedback for this research survey indicated that the smaller firms may not necessarily follow the best practice characteristics identified in this survey as they were quite complex and mainly suited bigger firms.

First Results from the 2003 Comparative Performance Assessment Study (CPAS)

The PDMA foundation conducted the Comparative Performance Assessment Study (CPAS) in 2003 following on from an earlier study conducted in 1995 (Hustad 1996). The report presents the first findings of the research and is based on 201 responses primarily from PDMA members. A 16-page survey and glossary of terms were sent to U.S. PDMA practitioner members in May 2003, and to those who expressed interest on the PDMA Website. The survey was conducted at the business unit level, and focused on four major topics within new product development:

- The process by which products are development internally
- The Fuzzy Front End and portfolio management
- Organizing for product development
- Tools/methodologies supporting product development

The survey also included questions related to new product outcomes and business unit characteristics that enable comparisons among companies of different sizes, technology base, customer focus, and different levels of success. For many of the questions, distinctions were made between radical innovations, more innovative projects, and incremental innovations. The most successful business units or “the best” had to be

- The most successful or in the top third in their industry for NPD success and

- Above the mean for their new product programme success and
- Above the mean for market financial success from new products.

The results indicate that the overall success with new products has been fairly consistent since 1995 for PDMA Members. The “Best” are significantly better than the rest. 80% of the respondents have a formal process for conducting new product development compared to 75% in 1995. 77% of the respondents have a specific strategy for their new product activities compared to 63% in 1995. However, less than half have both a strategy and a portfolio management system. The respondents were found to be managing the Fuzzy Front End better. There is a significant use of formal processes for idea generation and screening. Only 64% of ideas are proceeding to business analysis compared to 75% in 1995.

The number of Fast Followers has also increased since the last survey, indicating a disinclination to pursue new products. The author also contends that there is a shift in investment from more to less innovative new products and from more-expensive to less-expensive tools and methodologies that support product development. The CPAS project was still in progress at the time of writing this.

4.4.3 Elements of NPD Best Practices

The literature review also focused on studies around the characteristics or elements of NPD practices like strategy, portfolio management, process and market research. One of the objectives of this research was to identify the poor, good, better and best characteristics of NPD best practices in New Zealand. The study indicated that firms in New Zealand had a good understanding of these characteristics.

Benchmarking Best NPD Practices by American Productivity and Quality Centre (APQC)

The research was undertaken by the APQC with the authors as subject matter experts. The study uses the APQC's standard methodology, including both qualitative (site visits to five companies[1]) and quantitative methods (questionnaire consisting of 113 measures to capture the existence and proficiency of NPD practices and approaches, as well as gauge businesses' new product performance)

Part one of the study reported NPD performance results of businesses, identified a group of Best Performing businesses (the "benchmark businesses") and identified the "best practices" which separated the Best from the Worst Performers.

Part two of the study focuses on product innovation strategy and how it impacts performance, typical breakdown of development projects, portfolio management methods and their impact, resource allocation and management, and whether resources are sufficiently focuses at the project team level.

Part three of the study moves from strategic issues to the tactical aspects of the Product Development process. It focuses on the new product process and embedding best practices, such as voice-of-customer and getting sharp product definition. Methods that businesses use to define successful new products are also discussed.

The study found that putting a formal NPD process such as Stage Gate in place was clearly a strong practice among better performers. But it was how the process and its activities and recommended practices are implemented that

[1] Air Products and Chemicals Inc, Bausch and Lomb, EXFO Electro-Optical Engineering Inc, ExxonMobil Chemical Company, and Kraft Foods Inc.

made the difference. The eight activities with the greatest impact on performance were found to be

- Conducting a post-launch review
- Value assessment
- Test market or trial sell to a limited set of customers
- Concept testing
- Idea generation
- Customer tests of product under real-life conditions
- Detailed market study/research, or voice of customer
- Pre-launch business analysis

“Global Innovation 1000” study by Booz Allen Hamilton (2007)

Booz Allen Hamilton conducted a study of 1000 publicly-held companies around the world that spend the most on research and development. The study found no statistically significant connection between the amount of money a company spent on innovation and its financial performance. The study found two primary success factors

- Aligning the innovation model to corporate strategy
- Listening to customers every step of the way

The study also identified three primary innovation strategies used by a select group of companies among the “Global Innovation 1000”. These strategies were

- Need Seekers – these companies actively engage current and potential customers to shape new products, services, and processes; they strive to be first to market with those products
- Market Readers – these companies watch their markets carefully, but they maintain a more cautious approach, focusing largely on creating value through incremental change
- Technology Drivers – these companies follow the direction suggested by their technological capabilities, leveraging their investment in R & D to

drive breakthrough innovation and incremental change, often seeking to solve the unarticulated needs of their customers.

Benchmarking the Firm's Critical Success Factors in New Product Development – Cooper and Kleinschmidt (1995)

This study proposed that a company's overall new product performance depends on:

- process and the specific activities within this process
- the organisation of the NPD programme
- strategy
- culture and climate for innovation
- senior management commitment to NPD

The study further considered 10 performance measures of a company's new product programme: success rate, percent of sales, profitability relative to spending, technical success rating, sales impact, profit impact, success in meeting sales objectives, success in meeting profit objectives, profitability relative to competitors, and overall success.

The 10 performance metrics were reduced to two underlying dimensions: programme profitability and programme impact. These were used to form a performance map to depict the relative performance of the companies involved in the study. The map broke down the respondents in to four performance groups: solid performers, high-impact technical winners, low-impact performers, and dogs. Based on this analysis, nine constructs that drive performance and separate the solid performers from the dogs were identified. These are (in rank order): a high quality new product process; a clear, well communicated new product strategy for the company; adequate resources for new products; senior management commitment to new products; an entrepreneurial climate for product innovation; senior management accountability; strategic focus and synergy; high-quality development teams; and cross-functional teams.

Some of the constructs identified by Cooper and Kleinschimdt were similar to the seven dimensions of NPD identified in the current research. Strategy, process, and project climate are part of the seven dimensions.

4.5 Research into Product Development Practices in New Zealand

4.5.1 Small to Medium Enterprises in New Zealand

According to the Ministry of Economic Development 2010 report on the SME Structure & Dynamics, 463,278 SMEs make up more than 97.2% of all businesses. The SME sector broadly covers micro-enterprises (fewer than 5 staff), small enterprises (6-49) and medium enterprises (50-100). At February 2006:

- 97.2% of enterprises employed 19 or fewer people.
- 89.7% of enterprises employed 5 or fewer people.
- 68.8% of enterprises had no employees.

SMEs accounted for 30.7% of total employment as at February 2009. The number of people employed by SMEs decreased by 3.3% between 2008 and 2009 to 587,520, which may be an effect of the economic downturn (SMEs in New Zealand – Structure and Dynamics, 2010). The figure below gives a breakdown of the number of New Zealand enterprises by size.

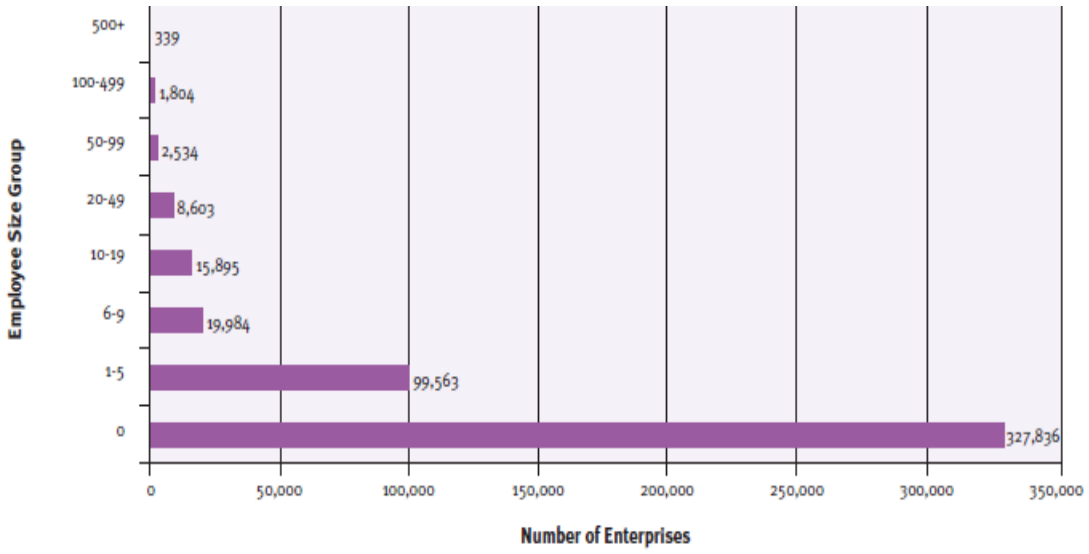

Figure 4: Number of Enterprises by Size, at February 2009 (SMEs in New Zealand – Structure & Dynamics 2010)

4.5.2 Innovation in New Zealand

The Business Operations Survey 2009 reports that there is little difference between the different types of innovation; however, there is a large difference in the overall rate of innovation between employee size groups. Firms with 6-19 employees had the lowest innovation rate at 43%, while those with 100 or more employees had the highest innovation rate at 64%. This is an important factor considering a majority of New Zealand businesses have fewer than 19 employees.

Some of the key results of the survey have been outlined below:

- Businesses with 6-19 employees were the least likely to have none of their sales from product innovations, and the most likely to have between 41% and 100% of sales from product innovations.
- Two thirds of all firms surveyed reported that when assessing their performance they put a great deal of focus on financial performance, while only 15% emphasised innovation.
- 20% reported that they did not focus at all on innovation.

- Ninety per cent of businesses identified that one of the reasons they innovated was 'to increase revenue.' This was followed by 'increasing productivity' (78%), 'increasing responsiveness to customers' (73%), 'reducing costs' (72%) and to 'increase market share' (72%).

Although this is an important sector which makes up for over 90 percent of businesses in New Zealand, there has been no substantial research in the area of NPD practices of NZ SMEs. Their business practices differ substantially to large corporations and are often constrained by resources and manpower. A report by the NZ Centre for SME Research found that a lot of firms could identify performance goals, systems for tracking performance and "excellent" practices. However, business excellence was interpreted as being able to "do things well" rather than sustaining a high level of performance. The report also found that many firms did not have a formal quality management system and industry standards acted as best practices. [2]

4.5.3 NPD in Small to Medium Enterprises in New Zealand

There has been limited research in to the NPD practices and processes of small to medium enterprises in New Zealand. The literature review has tried to focus on the most relevant research in this area.

A study of the Product Development Practices of Small Manufacturing Companies in New Zealand – Geoffrey Brian Kerr (1994)

Eighty-four small New Zealand manufacturing companies with less than fifty employees were surveyed in this study. The companies were in the food, electronics and light engineering industries. The key findings of the research included the following

[2] MICRO BY NAME, MEDIUM BY NATURE? A REPORT ON AN INVESTIGATION INTO BUSINESS EXCELLENCE & NEW ZEALAND MICRO-ENTERPRISES by Claire Massey, Terry Auld, Kate Lewis, Martin Perry, Robyn Walker and Virginia Warriner, New Zealand Centre for Small & Medium Enterprise Research, Massey University, 2005

- The Product Development process as used by New Zealand small manufacturing companies was truncated, missing vital stages, and concentrated on the physical development of the product.
- The techniques used by small companies within the stages of Product Development were simple, easy-to-use and non-complex, and were characterized by informal and reactive approaches.
- There is a base-level of knowledge internationally for the use of the Product Development process as displayed by a comparison among New Zealand, Canada and Spain practices. New Zealand small company practice more closely followed that of Spanish small companies.
- Management plays a fundamental role in Product Development in small companies. Although they play a key participative role and recognize the necessity for effective Product Development, they are unskilled in how to or are unable to provide the mechanisms to support effective Product Development programmes through lack of resources or time.

Feedback from firms that took part in the survey indicated that SMEs are more agile than bigger firms in reacting to market situations.

Examining the Product Development Process in New Zealand SMEs (Gawith et al. 2008)

This study used an adapted version of the PDMA Comparative Performance Assessment Study survey questionnaire to examine the product development process in New Zealand enterprises. The study found that few SMEs had formal product development processes and the survey instrument was not appropriate for such small enterprises.

The survey also found that the best SMEs obtained their radical ideas through formal processes. The authors further state that the better performing SMEs were typically characterised by small energetic teams that were well-led by the

company owner or manager, resulting in less risk aversion and greater innovation. These companies did not implement multistage disciplined process to achieve successful product development according to this study.

4.6 Background Literature to this Research

4.6.1 NPD Best Practices Framework

Perspective – Establishing an NPD Best Practices Framework (2004)

The article was first presented at the 2004 Product Development Management Association (PDMA) Research Conference in Chicago. It proposes a best practices framework for NPD management. The authors relied on the 1995 PDMA benchmarking study published by Griffin (1997) and the study by Cooper, Edgett, and Kleinschmidt (2004a, 2004b). The result is a process framework comprising six NPD dimensions across four levels of sophistication to describe states of poor, better, good and best practice pertaining to new product management. Managerial implications and research considerations with regards to what best practice means are also discussed.

Benchmarking helps organisations identify gaps between their current practice and the competition and show what needs to be changed. Benchmarking is seen to be accomplished through three phases

- Performance benchmarks – provide data that measure the gap between an organisation's performance and others
- Process proficiency – the organisation inventories and documents its processes and assigns ownership for process improvement to become proficient
- Best practice mastery – the respective firm incorporates what it seems as best practice

A review of recent benchmarking studies of NPD practices was conducted, to develop a best practices framework or benchmarking framework, to serve the needs of both profit and non-profit organisations.

Using PDMA's work on NPD certification (PDMA, 2004), NPD practices were delineated across six NPD management dimensions –

1. Strategy
2. Portfolio management
3. Process
4. Market research
5. People
6. Metrics and performance evaluation

Each dimension is described across four levels of sophistication, with each level corresponding to a particular set of characteristics

1. Level one – Poor or rudimentary practice
2. Level two – Better practice
3. Level three – Good practice
4. Level four – Best practice

Based on Cooper, Edgett and Kleinschmidt (2002) and Kahn et al's own observations, a number of companies were found to be level one or partially level two when it came to NPD sophistication. The companies were found to lack an NPD process. They failed to prioritize NPD projects or use a portfolio management approach. The companies also had a predominance of pet projects, a lack of standard criteria for evaluating NPD projects and the overall NPD effort, a short-term, tactical view of NPD and a lack of market research. A level four company is expected to have a formal NPD process including portfolio management, visible gates, proactive market research, cross-functional teams and standard criteria to support NPD as a strategic initiative.

The proposed best practices framework is an initial attempt to organize benchmarking data from published studies supplemented by the experience of the authors in recent NPD process benchmarking efforts. The proposed framework is offered as a tool for characterizing and delineating NPD practices and to fuel further investigations in to what constitutes best practice.

4.6.2 Rejoinders to the NPD Best Practices Framework

Thomas D. Kuczmarski (March 2006) stated that he agreed fully with the six practices presented in the above article. He further adds two additional practices, he sees as being critical to innovation success. These include compensation and rewards linked to new product performance in the marketplace; demonstrated senior commitment to innovation in the form of an agreed-on strategy; adequate resources; and a long enough time horizon to let newness happen.

Marjorie Adams-Bigelow (March 2006) stated that a best practices framework can provide a comprehensive view of NPD and the current thinking about best practices in the field. But a best practices framework does not provide the specifics of how to fix areas designated as a focus for improvement. She further added that a best practices framework does not include the metrics a firm should use to evaluate performance over time.

Elko J. Kleinschmidt (March 2006) stated that the developed framework is a great base for focusing discussion on what is known in NPD, as well as where numerous gaps in knowledge exist. Considering all of the questions raised by authors of the framework and the general lack of soft resources not considered, Elko concluded that the existing framework should not yet be offered for helping companies assess their position within the framework.

Richard Notargiacomo (March 2006) stated that the development and use of an NPD best practices framework is a critical element in driving a successful new product programme. The author further added that a framework provides a

common language and measures the entire business team can use to monitor and improve performance.

Lois Peters (March 2006) stated that she has two main concerns with the proposed framework. First, technological and macroenvironmental change can make best practices in one generation obsolete in another. Second, all product innovation pathways to launch do not have the same challenges. She adds that it would be fruitful to investigate how the concepts of Radical Innovation (RI) capabilities of discovery, incubation, and acceleration can contribute to frameworks for practices under different conditions of uncertainty and objectives.

CHAPTER 3

5. OBJECTIVES OF THE RESEARCH

This research is based on the "Establishing a NPD Best Practices Framework" study carried out by Kenneth Kahn, Gloria Barczak and Roberta Moss. The original survey was designed to assess the characteristics of poor, good, better and best practices of companies in the US, UK and Ireland based on seven dimensions [3]of New Product Development. The survey format has been retained and research was carried out to assess the NPD characteristics of Small to Medium Enterprises (SMEs) in New Zealand. The main objectives of this research were to

- identify the most important dimension in terms of new product development success according to New Zealand SMEs

- identify the poor, good, better and best characteristics of New Zealand NPD practices based on the seven dimensions listed in the survey

- compare results from the New Zealand survey to results from the US, UK and Ireland.

[3] The seven dimensions of NPD have been identified as Strategy, Process, Research, Project Climate, Company Culture, Metrics & Performance Measurement and Commercialisation.

6. *Seven Dimensions of the Survey*

The seven dimensions of new product development were identified as

1. Strategy
2. Company culture
3. Process
4. Project climate
5. Metrics and performance measurement
6. Research
7. Commercialisation

The survey appeared to be quite complex for New Zealand SMEs. Companies involved in New Product Development tend to evolve systems and processes over time which may or may not be in sync with those widely practiced. This is especially true in Small to Medium Enterprises where the ability to resource NPD projects may be extremely limited. However, this survey provided a starting point for further discussions in the area of NPD in SMEs.

6.1 Evaluation of the Seven Dimensions of the Survey

Evaluations of the characteristics of the seven dimensions of NPD identified in this survey have been listed below.

1. **Strategy:** ***the defining and planning of a vision and focus for research and development, technology, management, and NPD efforts at the SBU, division, product line and/or individual project levels, including the identification, prioritization, selection and resource support for preferred projects.***

Having a clearly defined NPD goal can be considered best practice. The author believes that the company vision statement should include a reference to NPD goals. To quote Akio Marita, Sony's visionary leader "our plans is to lead the public with new products, rather than ask them what kind of products they want;

hence we create new products and then create a market by educating and communicating to the public about the product".

2. **Company Culture*: the company management value system driving those means and ways that underlie and establish NPD thinking and NPD collaboration with external partners, including customers and suppliers.***

One of the characteristics mentioned under this section is that “Resources are made available for personnel to pursue novel ideas”. A good example of this is Google where employees are allowed to spend 20% of their time on pet projects. However, this may not be practicable in SMEs. An interesting point to note is that Google has decided to scale back on this model due to the ongoing economic slowdown.

3. **Process: *the implementation of NPD stages and gates for moving products from concept to launch coupled with those activities and systems that facilitate knowledge management for NPD projects and the NPD process*.**

Although companies should have a formal NPD process in place, the process should be flexible enough to accommodate any changes. The same NPD process may not be suitable for the entire organisation and departments should have sufficient freedom to modify the NPD process to suit their requirements.

4. **Project Climate: *the means and ways that underlie and establish NPD intra-company integration at the individual and team levels, including the leading, motivating, managing, and structuring of individual and team human resources.***

One characteristic that was not clear was: “Not all projects go through NPD group; some projects are simply handled by department managers”. It wasn’t

clear if these related to NPD projects. The other characteristic that needed looking in to was “A NPD group exists and is dedicated to just NPD work”. In New Zealand, where more than 86 percent of enterprises employed 5 or fewer people, having a NPD group dedicated to just NPD work might not be feasible.

5. **Metrics and Performance Measurement:** ***the measurement, tracking, and reporting of NPD project and NPD program performance.***

The mention of “multiple reviewers” was considered very interesting. Having multiple reviewers is not an option when the size of the project team is minuscule. Having multiple review stages appeared to be a more feasible option. This may however skew the vision of the project team if the same personnel were involved in different review stages. The other characteristic mentioned under this segment was “Projects are never killed”. This would appear to be poor practice and points to a lack of review stages. Projects should be reviewed at every stage of the NPD process. This may be especially true of SMEs where there are resourcing constraints and devoting time and money to projects that are deemed to fail would be disastrous.

6. **Research:** ***the application of methodologies and techniques to sense, learn about, and understand customers, competitors, and macro-environmental forces in the marketplace, including focus groups, paper-based surveys, electronic surveys, and ethnographic study.***

This may be considered a very important stage of any NPD process. Understanding the needs and wants of a customer has always been vital to the success of any NPD project. The survey mentioned employing subject matter experts for macro-environmental research. As stated before, resource constraints in SMEs would hamper hiring experts outside the employee pool. There is also a need to analyse the market after the product has been released. This may include research in to post-launch trends, customer feedback and future

products. Although this could fall under the “Commercialisation” dimension, the author believes this characteristic was also an integral part of “Research”.

7. **Commercialisation:** ***activities related to the marketing, launch, and post-launch management of new products that stimulate customer adoption and market diffusion.***

Marketing budget changes should be flexible enough to be altered not just up to the point of launch but also post-launch. Research in to post-launch trends and customer feedback should also be considered under this dimension. Along with policies for return and replacement, product recall policies can also be considered essential. Customer service and support should be trained to deal with new product enquiries.

7. SURVEY METHODOLOGY

The research survey questionnaire was sourced from the Kahn, Barczak, Moss best practices framework used for the US, UK and Ireland surveys, the results of which have been presented later in this report.

The survey had three parts – the first part dealt with demographic information regarding title, industry type, years of experience, company size along with innovation performance characteristics. The second part provided the definitions of the seven dimensions and asked respondents to indicate the relative importance of each element by allocating 100 points across the seven features. The third part of the survey provided respondents with the list of characteristics outlined for a particular dimension and asked them to indicate, for each element, whether it represented poor, good, better, or best practice.

Changes were made to the original survey to mirror local conditions. These were related to Part 1 of the survey and questions 7 and 8 in particular. The value of the options under size of companies was reduced to reflect New Zealand

conditions. The same was done under options for annual sales of companies. The survey was also designed to identify the best practices across a range of NPD activities.

Pilot surveys were carried out to determine response time and initial feedback. The pilot surveys indicated that the survey was quite complex in parts and the characteristics defined under each of the seven dimensions may be more suited to large corporations rather than small to medium enterprises. Professor Kenneth Kahn was consulted regarding the complexity of the survey for New Zealand respondents and discussion resulted in the respondents being given Part 1 and Part 2 of the survey with Part 3 being optional.

7.1 Target Sectors

This research process consisted of identifying small to medium enterprises in some of the core areas of innovation vital to New Zealand's future. Manufacturing, Food Technology and Biotechnology areas were considered. Manufacturing contributes 13.1% of the GDP and employs 12.4% of the labour force. Dairy and meat are two of New Zealand's biggest exports (source: www.investmentnz.govt.nz). Biotechnology was one of three sectors prioritised under the Government's Economic Transformation Programme. Hence a conscious effort was made to target companies involved in these sectors. Companies were contacted via phone to ascertain interest in completing the survey and the product development managers were then emailed a copy of the survey. Company information was obtained through industry groups like NZBIO (www.nzbio.org.nz), Plastics New Zealand (www.plastics.org.nz), Electronics South (www.electronicssouth.com), and other online resources like Yellow Pages and Finda (www.finda.co.nz).

7.2 Method

A quantitative survey method was chosen with a number of questions on topics and dimensions described in the sections below. The survey was carried out in

two batches. In the first batch, 102 respondents were contacted by phone to elicit interest. These included respondents sourced through NZBIO and Plastics New Zealand. The rationale behind the research was explained and respondents were asked whether they would like to take part in the research. The respondents were also assured of confidentiality. 40 of the 102 respondents agreed to complete the survey. The questionnaires were then emailed. Follow-up calls were made 2-3 weeks after the first round of emails to serve as both a reminder and also to answer any questions regarding the survey.

The second batch consisted of 51 respondents sourced from Electronics South and online databases like Yellow Pages and Finda. A similar approach as described above was followed. Respondents were contacted over the phone to elicit interest. 23 of the 51 respondents contacted agreed to complete the survey. Again, follow-up calls were made 2-3 weeks after the first round of emails to answer any questions regarding the survey. The respondents were emailed a reminder after 4 weeks.

Further research was undertaken to determine the nature of ranking the seven identified dimensions of NPD. These have been discussed in more detail in the analysis section of this report. This research included follow-up calls to respondents requesting more information on their criteria for rating the seven dimensions of NPD.

7.3 Questionnaire

The survey was designed as a 3-part questionnaire. The first part dealt with the demographic information demographic information regarding title, industry type, years of experience, company size along with innovation performance characteristics.

The second part asked the respondents to rate the identified seven dimensions of NPD as a percentage of their importance, with the ratings adding up to 100%.

The third part described some of the characteristics of NPD practices under each of the seven dimensions and respondents were asked to rate which of the characteristics corresponded to poor, good, better and best practices.

7.4 Response Rate

A total of 30 respondents completed the questionnaire. 19 surveys were rejected as being incomplete and 14 surveys failed to elicit a response. This represents a response rate of around 19%. The aim was to get Product Development Managers to complete the survey. In instances where the product development manager was unavailable either due to work/travel commitments, the person in charge of NPD was requested to complete the survey. 30 completed surveys were needed to achieve normality. 18 out of 30 respondents who completed the questionnaire chose to answer Part 3 of the survey.

Overall, the survey was received quite positively. The comments and suggestions have been outlined under the ‘Comments and Feedback’ section of this report.

CHAPTER 3

8. SURVEY RESULTS

The following section presents and analyses the results of the survey. The survey was designed as a 3-part questionnaire. The first part dealt with the demographic information demographic information regarding title, industry type, years of experience, company size along with innovation performance characteristics.

PART 1: Demographic information

8.1 Sectors involved in the study

Figure 5 below shows the sectors involved in the study. An attempt was made to restrict the survey to not more than three different sectors. This helped maintain homogeneity of the sample size. Manufacturing constituted the biggest portion of the survey followed by Food Technology and Biotechnology. Among those surveyed, 46% of the respondents were from the Manufacturing sector, 20% of the respondents were from the Biotechnology sector, 26% of the respondents were from the Food Technology sector, and 6% of the respondents identified themselves as 'Other'.

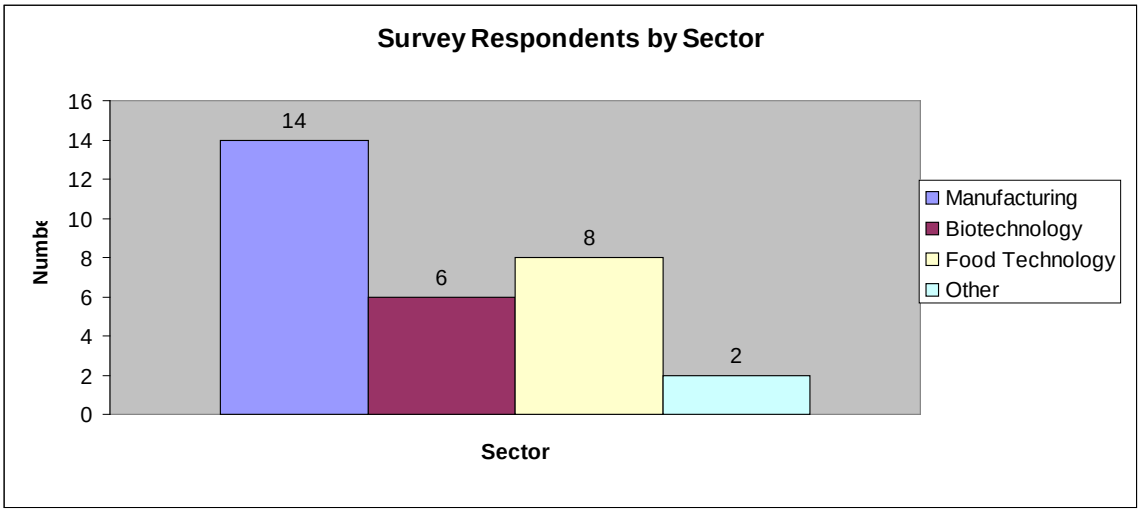

Figure 5: Survey respondents by sector

8.2 Type of markets served

Figure 6 below shows a breakdown of the companies involved in the survey by the type of markets served. Approximately 43% of the companies were involved in Business to Business markets and 37% were involved in Consumer and Business to Business markets. A further 10% served only the Consumer market while the remaining 10% served 'other' markets. Researchers argue that a firm's largest and closest customers often resist new technology and products, which initially do not meet their needs as effectively as the firm's current products. These customers demand incremental improvements to existing products, and firms are likely to respond favorably (Bower and Christensen, 1995; Chandy and Tellis, 2000). Another interesting aspect of business-to-business (B2B) new product development is that a relatively small set of customers and potential customers can exert significant influence over a firm's NPD (Bonner and Walker Jr, 2004).

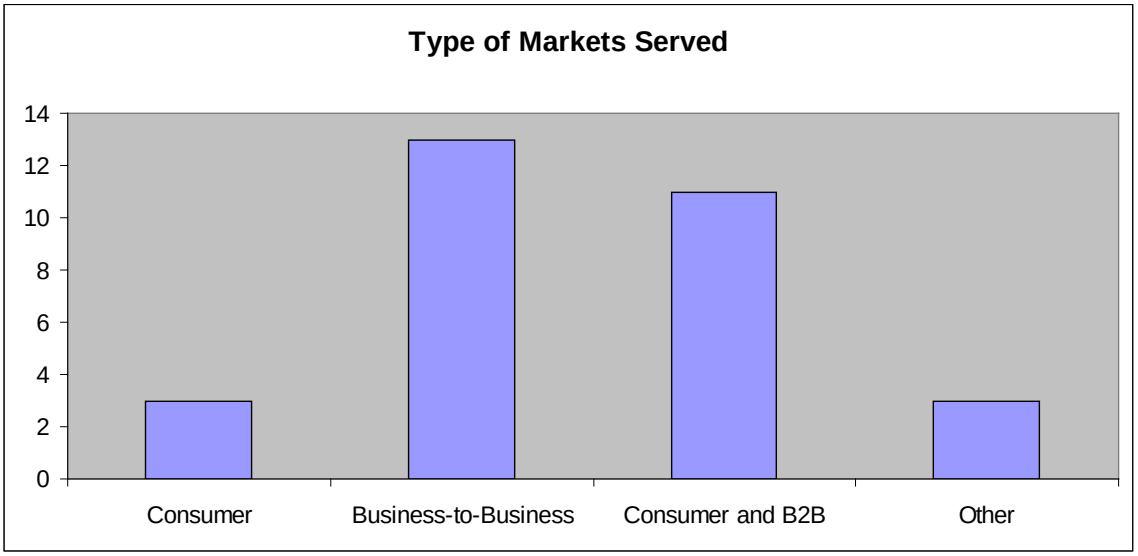

Figure 6: Type of Markets Served

8.3 Size of Companies

Figure 7 below gives an indication of the size of companies involved in the survey. Among those surveyed, 93% of the respondents had less than 100 employees. SME sector broadly covers micro-enterprises (fewer than 5 staff),

small enterprises (6-49) and medium enterprises (50-100). A further breakdown of this number shows that 5 respondents (17% of total) employed less than 5 staff. 9 respondents (30% of total) employed 5 to 10 staff. A similar percentage (30% of total) of respondents employed 11 to 50 staff and 17% of the respondents employed 51 to 100 staff. 2 respondents (6% of total) employed more than 100 staff. The size of companies involved in this survey reflects the nature of business in New Zealand. This aspect has already been discussed in more detail under 'Small to Medium Enterprises in New Zealand' section of the Literature Review.

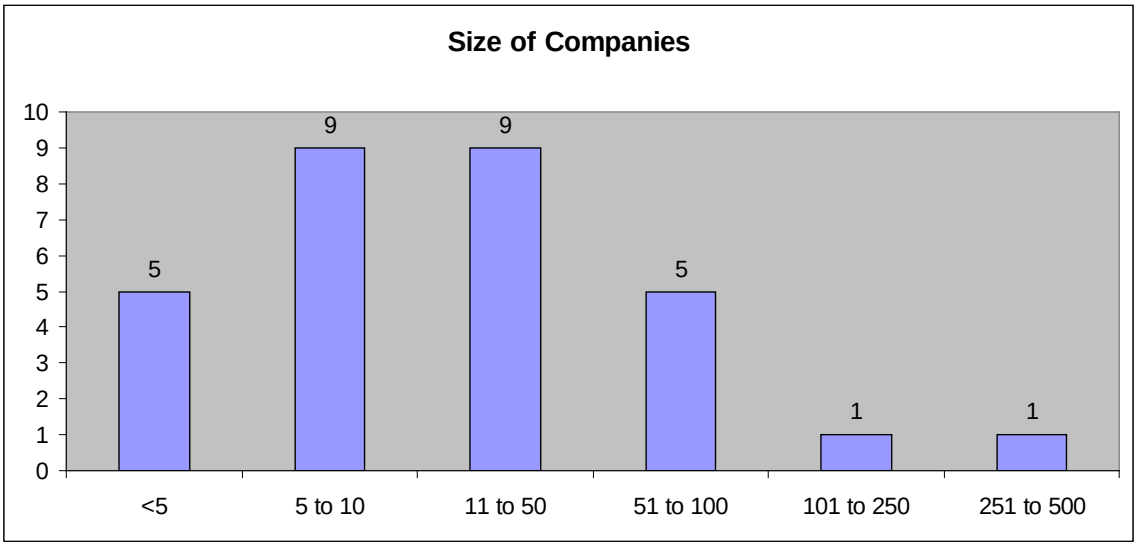

Figure 7: Size of Companies

8.4 Company Annual Sales

More than a third of the companies surveyed had an annual sales income of under $5 million. Among those surveyed, 23% had an income of less than $1 million. 20% had sales of $5 to $10 million, 10% had sales of $10 to $20 million.

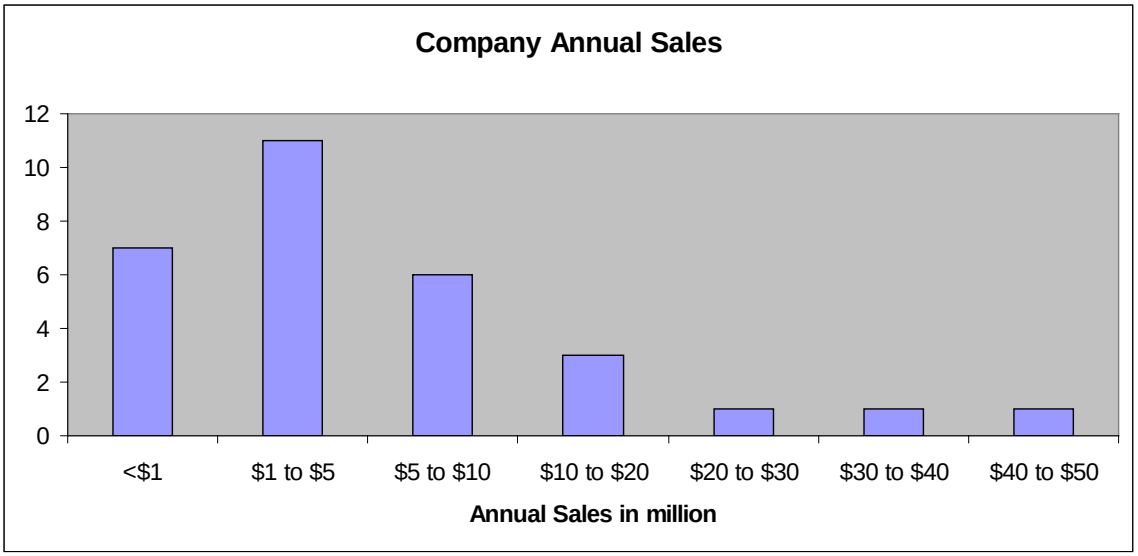

Figure 8: Company Annual Sales

Comparison of percentage sales generated by products introduced in the past 5 years and optimal percentage of sales for the company in terms of sales generated by products introduced in the past 5 years.

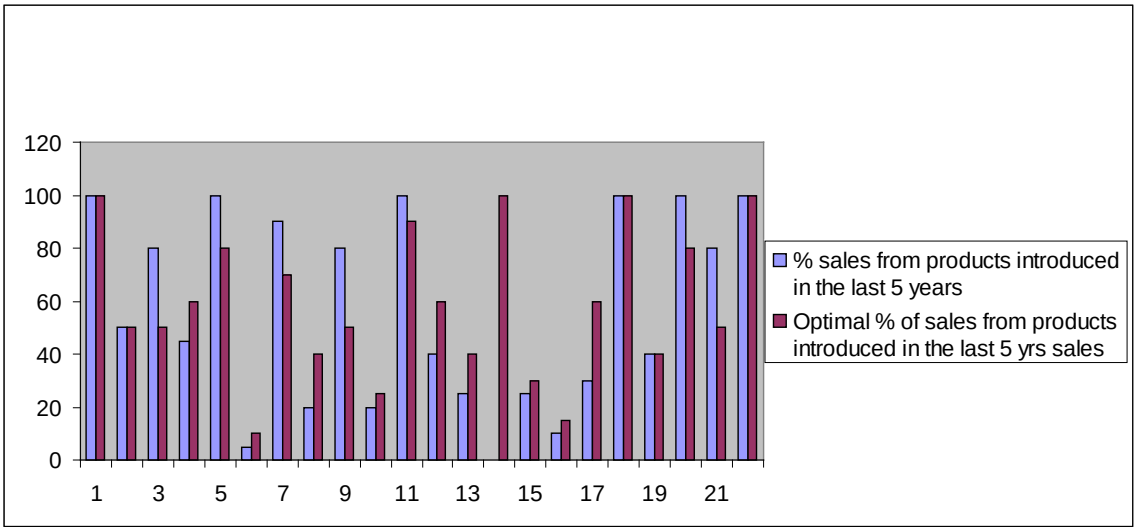

Figure 9: Comparison of Product Sales

Figure 9 above represents a comparison of the percentage sales generated by products introduced in the last 5 years and the optimal percentage of sales from products introduced in the last 5 years. Not all the companies that returned the survey completed this section and hence the data does not cover all 30

respondents. 64% of the respondents who completed this section indicated that the optimal percentage of sales from products introduced in the last 5 years should be more or equal to the actual percentage of sales from products introduced during that period. This shows that a majority of the companies would like their sales from new products to either stay at existing levels or increase in comparison to previous years. Among those surveyed, 23% of the respondents indicated that 100% of their sales were from new products introduced over the last 5 years.

PART 2

8.5 Seven Dimensions of NPD

The Seven dimensions of NPD practice were identified as strategy, process, research, project climate, company culture, metrics & performance measurement and commercialisation by Kahn, Barczak and Moss (2006). They were defined as follows:

1. STRATEGY: the defining and planning of a vision and focus for research and development, technology management, and NPD efforts at the SBU, division, product line and/or individual project levels, including the identification, prioritization, selection, and resource support of preferred projects.

2. PROCESS: the implementation of NPD stages and gates for moving products from concept to launch coupled with those activities and systems that facilitate knowledge management for NPD projects and the NPD process.

3. RESEARCH: the application of methodologies and techniques to sense, learn about, and understand customers, competitors, and macro-environmental forces in the marketplace (e.g., focus groups, mail surveys, electronic surveys, ethnographic study).

4. PROJECT CLIMATE: the means and ways that underlie and establish NPD intra-company integration at the individual and team levels, including the leading, motivating, managing, and structuring of individual and team human resources.

5. COMPANY CULTURE: the company management value system driving those means and ways that underlie and establish NPD thinking and NPD collaboration with external partners, including customers and suppliers.

6. METRICS & PERFORMANCE MEASUREMENT: the measurement, tracking, and reporting of NPD project and NPD program performance.

7. COMMERCIALIZATION: activities related to the marketing, launch, and post-launch management of new products that stimulate customer adoption and market diffusion.

The survey requested respondents to indicate how important each dimension was in terms of percent importance weighting, relative to each other. The sum of these importance weightings had to sum to 100%. Figure 10 below gives an account of the dimensions that were considered important. It has to be noted that each survey did not record different weightings for each dimension. Respondents gave equal weightings to more than one dimension in many of the surveys.

Strategy was identified as the most important of the seven dimensions listed in the survey followed by Commercialisation, Research, Company Culture, Process, Project Climate and Metrics & Performance Measurement.

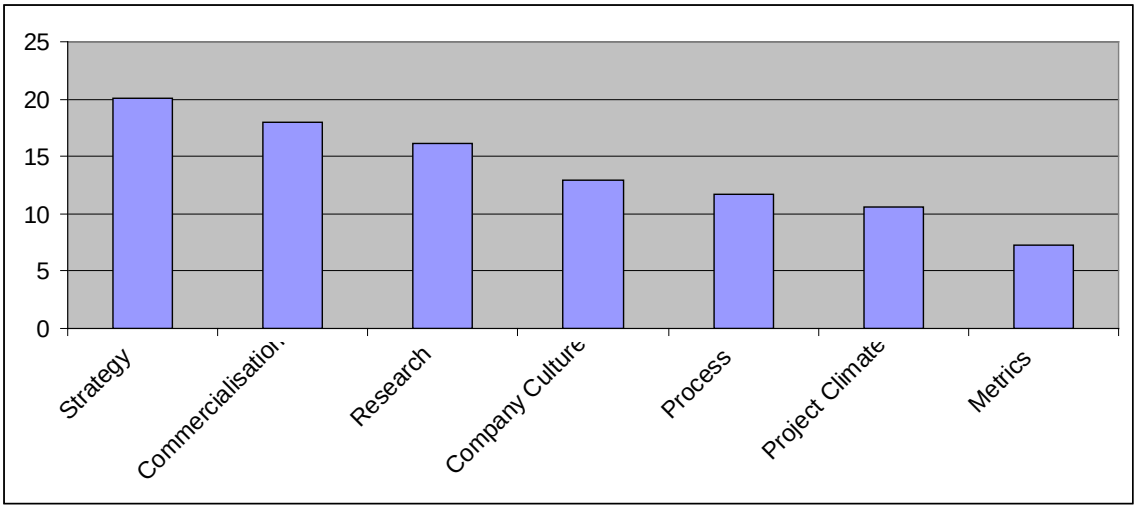

Figure 10: Ranking of Seven Dimensions of NPD

The survey results are consistent with those from the US, UK and Ireland. The subsequent sections discuss the results in more detail and also analyses why 'Strategy' was considered the most important of the seven dimensions.

A further breakdown of the results by sector indicates that new product strategy was ranked the most important of the seven dimensions. Commercialisation was ranked the second most important by both Manufacturing and the Bio-technology sectors followed by research. The Food technology sector ranked research marginally ahead of commercialisation. Metrics ranked lowest among all three sectors. These aspects have been discussed in more detail under 'Discussions and Implications'.

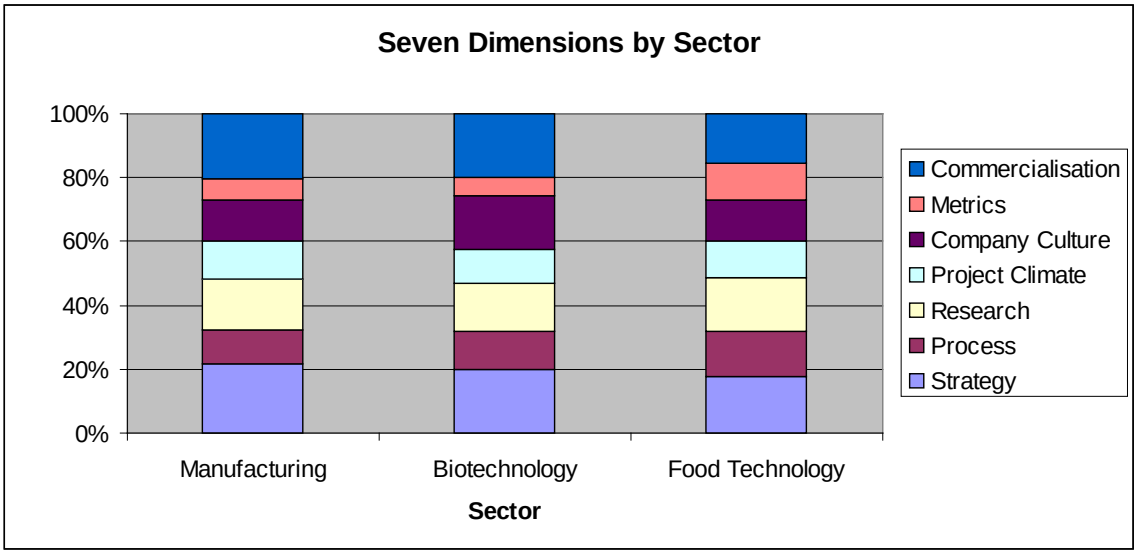

Figure 11: Seven Dimensions of NPD by Sector

PART 3

8.6 Characteristics of the Seven Dimensions

Table 2: Elements of Best vs. Poor Practice for each Dimension: Best versus Poor Practices Receiving a Majority Response in New Zealand

Table 2	**Best Practice**	**Poor Practice**
Strategy	– Opportunity identification is ongoing and can redirect the strategic plan real-time to respond to market forces and new technologies – The organisation views NPD as a long term strategy – NPD projects and programmes are reviewed on a regular basis	– No NPD goals – The organisation views NPD only as a short-term tactical initiative – Unclear NPD goals – No prioritisation of NPD projects

Process	– The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects – A clear NPD process exists	– No NPD process exists – Minimal testing (concept, product, market) performed – There is no discipline in using the organisation's NPD process – Projects are not reviewed at completion
Culture	– Top management supports the NPD process – The company actively works with customers to develop new solutions – An innovative culture pervades the organisation	– NPD is not a management priority – All NPD ideas come from within the company
Project Climate	– Each project has a clearly identifiable project leader – Product champions are critical for project success – NPD is team-focused	– No identifiable NPD group – No project leader(s) – Interaction and knowledge transfer between functional areas is poor
Research	– Customer/user is an integral part of the NPD process – Results of testing (concept, product, market) are formally evaluated.	– No real evaluation of testing (concept, product, market) results is undertaken – Little if any market research is undertaken – No market studies are undertaken to understand market place
Metrics	– Board of Directors must approve really new ideas/projects and/or big projects – Business plans must be approved by Directors,	– One person does all NPD project evaluations – Projects are never killed – No standard criteria for

	VP's – A set of general guidelines for evaluating projects exists	evaluating the overall NPD effort exist
Commercialization	– Sales force training is an important consideration before launch – Customer service and support are part of the launch team – A launch process exists	– Launch decisions are kept confidential by the launch team due to fear of public announcement – Marketing budget decisions can dramatically change up to the point of launch – One department is assigned to lead the launch process

9. RESULTS FROM THE UNITED STATES, U.K. AND IRELAND

The figure below provides the relative importance of NPD dimensions comparing samples from the US, UK and Ireland. Strategy was considered the most important dimension in both the samples, followed by commercialisation. Metrics ranked the lowest in both the samples. Tables 4, 5, and 6 are reproduced from Kahn et al's paper on the results of the US, UK and Ireland studies.

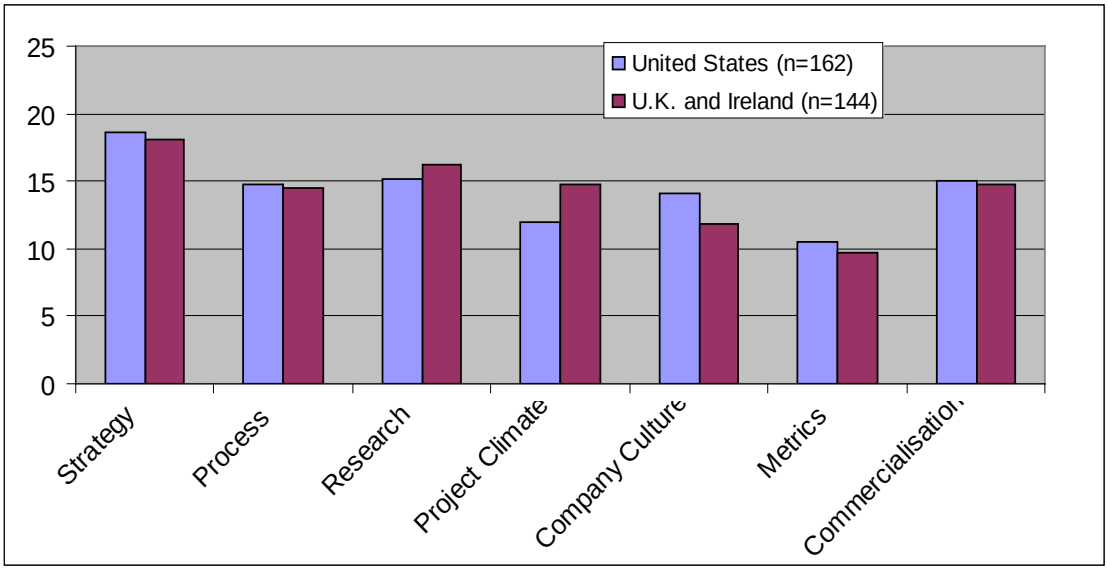

Figure 12: Relative importance of NPD Dimensions comparing United States, UK, and Ireland samples

The figure below illustrates the relative importance of the seven dimensions across the combined US, UK and Ireland samples (n=306).

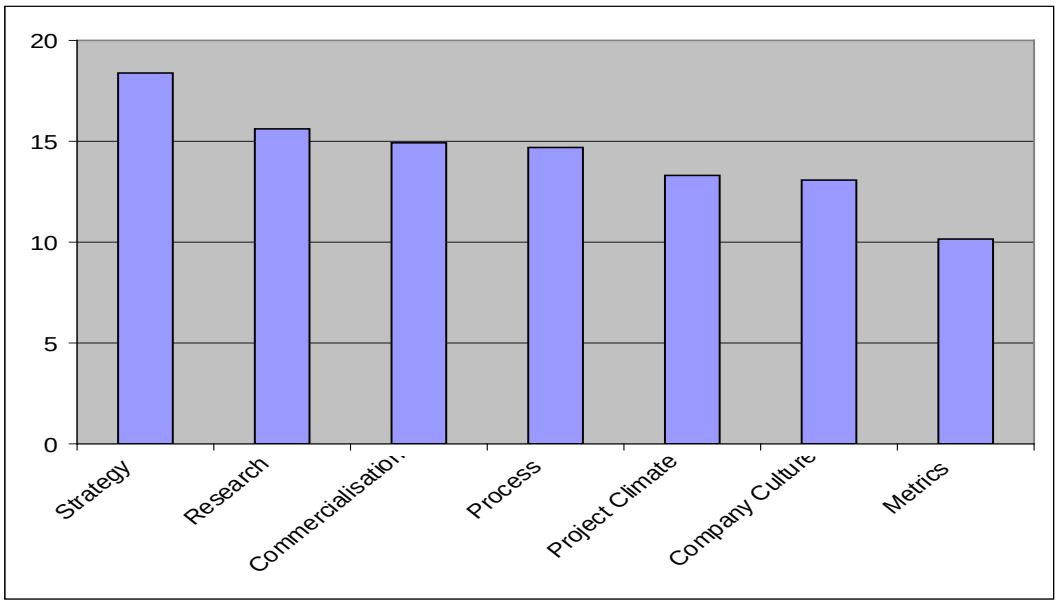

Figure 13: Relative importance of NPD Dimensions across combined US, UK and Ireland samples

The table below provides an overview of the poor and best practice characteristics of NPD identified by the respondents in the US, UK and Ireland under each of the seven dimensions.

Table 3: Elements of Best vs. Poor Practice for each Dimension: Best versus Poor Practices Receiving a Majority Response in the US, UK and Ireland

Table 3	**Best Practice**	**Poor Practice**
Strategy	– Clearly defined and organisationally visible NPD goals – The organisation views NPD as a long term strategy – NPD goals are clearly aligned with organisation	– Most NPD projects fit with mission, but some pet projects that do not fit mission exist – No NPD goals – The organisation views NPD only as a short-term

	mission and strategic plan – NPD projects and programs are reviewed on a regular basis – Opportunity identification is ongoing and can redirect the strategic plan real-time to respond to market forces and new technologies – All projects are aligned with the organisation's mission/strategic plan – A portfolio management process is used to manage existing offerings	tactical initiative – Unclear NPD goals – No concern over types of NPD projects being developed – No process for undertaking portfolio management – NPD projects may or may not be aligned with organisation's mission / strategic plan – NPD projects are evaluated relative to other projects in a portfolio
Process	– A common NPD process cuts across organisational groups – Go/No-Go criteria are clear and pre-defined for each review gate – The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects – The NPD process is visible and well-documented – The NPD process can be circumvented without management approval – An IT infrastructure with appropriate hardware, software, and technical support is available to all NPD personnel – Knowledge of projects is stored and available to NPD personnel – Project management software and techniques are used to manage projects	– Criteria for evaluating NPD projects are not defined – Limited documentation on the NPD process exists – Minimal testing (concept, product, market) performed – No NPD process exists – There is no NPD process owner or NPD process champion – Not all NPD personnel have access to the same IT tools (software, hardware)
Culture	– Top management supports the NPD process	– The company actively works with customers to

	– Management rewards and recognizes entrepreneurship	develop new solutions – All NPD ideas come from within the company
Project Climate	– Cross-functional teams underlie the NPD process – NPD activities between functional areas are coordinated through formal and informal communication.	– No identifiable NPD group – No project leader(s) – Functional areas only support those ideas which they originated – Interaction and knowledge transfer between functional areas is poor
Research	– Ongoing market research is used to anticipate/identify future customer needs and problems – Concept, product, and market testing is consistently undertaken and expected with all NPD projects – Customer/user is an integral part of the NPD process – Results of testing (concept, product, market) are formally evaluated	– Customer/user is uninvolved in NPD process – Little if any market research is undertaken – No real evaluation of testing (concept, product, market) results is undertaken – No market studies are undertaken to understand marketplace
Metrics		– No standard criteria for evaluating NPD projects exist – No standard criteria for evaluating the overall NPD effort exist – One person does all NPD project evaluations – Projects are never killed

Commercialization	– The launch team is cross-functional in nature – A project post-mortem meeting is held after the new product is launched – Logistics and marketing work closely together on new product launch – Customer service and support are part of the launch team – A launch process exists	– Marketing budget decisions can dramatically change up to the point of launch – Launch decisions are kept confidential by the launch team due to fear of public announcement

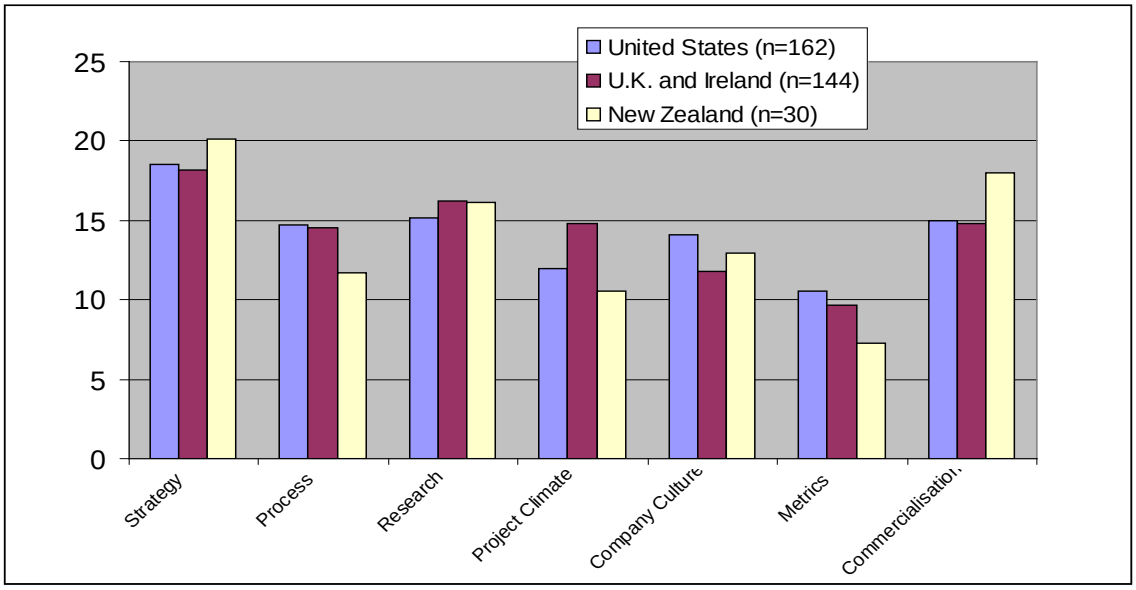

Figure 14: Relative importance of NPD Dimensions ACROSS United States, UK, Ireland, and New Zealand samples

The figure above presents the relative importance of seven dimensions as obtained from the US, UK, Ireland and NZ samples. Strategy is clearly on top across all three samples. Commercialisation has been rated higher in New Zealand and only below strategy compared to the other two samples. Research was rated only below strategy in both the US and UK samples. It was rated below strategy and commercialisation in the NZ sample. Metrics has been ranked the lowest across all three samples.

Table 4: Relative importance of NPD Dimensions across combined US, UK, Ireland and NZ

Table 4 Dimension	**(n=336)**	
Strategy	18.95%	Statistically greater than all other dimensions at the p<.05 level
Research	15.82%	Statistically greater than climate, culture, and metrics at the p<.05 level
Commercialisation	15.94%	
Process	13.68%	Statistically greater than culture and metrics at the p<.05 level
Project Climate	12.44%	Statistically greater than the metrics dimension at the p<.05 level
Company Culture	12.96%	
Metrics	9.17%	Statistically lower than all other dimensions at the p<.05 level

The table 8 above presents the importance of each of the seven dimensions based on a combined sample of results from the US, UK, Ireland and New Zealand. Strategy was statistically greater than all other dimensions. Metrics was statistically lower than all other dimensions. This was consistent with the results obtained when the samples were considered individually.

10. ANALYSES AND DISCUSSION

NPD practice is defined as customary performance that implements ideas and policies leading to the successful development of new products and services. Best practices would be those practices that appear to result in the most favourable outcomes. In the case of NPD practice, best practice would be those NPD practices that promote greater success in developing and launching new products and services (Kahn et al. 2009).

The Kahn, Barczak, Moss best practices framework was initially developed with six dimensions – strategy, portfolio management, process, market research, people, and metrics and performance. They were described as follows

- Strategy represents defining and planning a focus for the NPD efforts of a small business unit (SBU), division, product line and/or individual project
- Portfolio management represents the screening out of product concepts to identify preferable product concepts with which to proceed (Adams-Bigelow 2004)
- Process represents the NPD stages, corresponding activities, and gate criteria for moving products to launch
- Market research includes application of activities for sensing, learning about, and understanding customers, competitors, and macro-environmental forces in the marketplace
- People include human resources and team-related initiatives
- Metrics and performance evaluation pertain to how NPD performance is measured, tracked, reported, recognized, and rewarded.

A number of issues were identified with the validity of the six dimensions – inclusivity, equality, and sophistication or maturity. Inclusivity is concerned with determining whether the identification of best practices should be restricted to these six dimensions. Kahn et al. (2006) admit that elements pertaining to the fuzzy front end, lifecycle management and launch are missing. Equality refers to the weighting assigned to each dimension.

Kleinschmidt and Cooper (1995) proposed that a company's overall new product performance depends on 5 elements – process, organisation, strategy, culture, and commitment. The authors concluded that process was the most important driver of NPD success followed by a clear and well-communicated new product strategy.

An effective team structure, like a formal NPD strategy, can reduce cycle time by accelerating decision processes and the acquisition of resources (Parry et al., 2009). Research indicates that teams with the ability to make their own decisions develop products faster than teams that must obtain approvals from higher levels

of management (Brown and Eisenhardt, 1995; Hobday, 2000; Zirger and Hartley, 1994). 50% of the respondents in this survey were firms with less than 10 employees.

10.1 COMPARISON OF NZ RESULTS WITH THE US, UK AND IRELAND RESULTS

The results of this survey were broadly consistent with those from the US, UK and Ireland. Strategy was identified as the most important of the seven dimensions and Metrics was ranked the lowest. Kleinschmidt (2006) argued that companies that had the most well developed portfolio management approaches relied more on having a strong NPD strategy, suggesting that the presence of a strategy is prerequisite for having successful portfolio management. NZ respondents also rated commercialisation higher than research compared to US, UK and Ireland professionals. Company culture also ranked higher than both process and project climate with NZ respondents.

Metrics ranked the lowest across US, UK, Ireland and NZ results. This could mean that most respondents consider other dimensions to be more important than Metrics or there is not enough understanding of this dimension among NPD practitioners. NZ respondents also ranked process lower than research, commercialisation and company culture dimensions. As the literature review indicates, a lot of research has been focused on NPD process over the years. The results of this study and those from the US, UK and Ireland seem to indicate that process is no longer considered as important as other dimensions like strategy or commercialisation.

Barczak, Griffin and Kahn (2009) argued that because a majority of companies may have had a formal NPD process in place for several years and hence use of their process may be part of standard best practice, this led them to place less emphasis on process in relation to other dimensions. The other side of this argument was that there was little research available on the NPD processes of NZ companies. It could not be ascertained that most NZ companies follow a

standard best practice. A majority of the NZ SMEs surveyed did not have a dedicated NPD team and this could mean a lack of standard NPD process and hence, the emphasis on strategy and commercialisation. Gawith et al. (2008) stated that few SMEs in New Zealand had formal product development processes.

Table 10 below illustrates the size of the companies in the US, UK and Ireland samples. The size of the companies in New Zealand as compared to those in the US, UK and Ireland must be taken in to account while comparing the results across these countries. A majority of companies in New Zealand - around 99%, are SMEs. The definition of SMEs varies from country to country. Whereas a company in New Zealand with less than 100 employees is classed as a 'Medium' enterprise, it needs to contain less than 500 employees in the US and less than 250 in the UK.

Most of the companies in the US were larger firms, whereas the UK/Ireland sample comprised a majority of SMEs.

Table 5: Size of Companies in the US, UK and Ireland survey

Employee Number	U.S. Sample	Ireland/U.K. Sample
<10	10	13
11-500	35	75
501-1000	19	11
1001+	99	45
Total	163	144

Note: Not all U.S. respondents answered this question thus the total here does not equal the actual sample size.

10.2 IMPLICATIONS

Overall, the study indicates that companies in NZ, US, UK and Ireland agree that strategy is the most important of the seven dimensions listed and metrics is the

least important. It was also important to analyse why process ranked below strategy, research and commercialisation.

New product strategy refers to an explicit articulation of the role of NPD in achieving goals of the organisation (Cooper 2001). Studies show that a clearly defined strategy is critical to high performance (Cooper, 2001; Cooper and Edgett, 1999), regardless of whether the development effort is primarily tangible or intangible in nature (Griffin 1997). Respondents indicated that a formal strategy helped reduce processing time. Decisions were taken quickly because the head of the firm was directly involved in the product development process. This was possible due to the small size of the companies. 50% of the respondents had less than 10 employees as evident from the survey.

A vision statement for the company which incorporates NPD was also cited as an important part of the overall NPD strategy. This includes “well-defined NPD goals and long-term strategic support for NPD projects”. The creation of a strategic vision for the firm’s NPD program can help ensure that NPD efforts receive sufficient resources within the firm (Parry et al. 2009).

Commercialisation was ranked just below strategy and was the second most important of the seven dimensions. Respondents indicated the need for a strong commercialisation aspect due to a small and saturated market. According to a respondent, “In an increasingly competitive market, products have a short shelf-life and hence sales and marketing play an important role in increasing the return on investment”. Kahn et al. (2009) stated that the importance attached to commercialisation may reflect the current emphasis on customer participation in the NPD process through market research activities such as beta testing, customer site visits and voice of the customer research. The ‘Best’ performers use voice of the customer, customer site visits, concept tests, and beta site testing more than other firms (Griffin 1997).

Bio-technology firms considered research an important part of their NPD programme. They identified themselves as research-intensive which was also true of respondents involved in Food technology industry. Both these sector groups ranked research above all other dimensions and below only strategy.

Respondents indicated that due to the relatively small size of companies in NZ, there need not be a well defined NPD process with responsibilities and structures outlined. Small and nimble teams have the ability to make decisions on the go and with the head of the firm also in charge of NPD, this becomes much easier. Mosey (2005) found that SMEs' flexibility and ability to adapt offers them a competitive advantage over their larger rivals, arguing that SMEs can compete with their larger rivals by developing new-to-market products using novel technologies.

Respondents identified the need to have a strong NPD culture within the company. Management support for new ideas was stated as a major driver of innovation within the company. A respondent noted that "a company can have a good NPD process in place but management needs to encourage people to focus on innovation and support new ideas for the process to work". Cooper and Edgett (1999) argued that simply having a NPD process is not sufficient for success, but rather the nature of the process and the quality of its execution impact performance.

Metrics ranked the lowest across all surveys. Respondents indicated that measuring NPD success was important for future growth and strategy development. Griffin (1997) stated that the 'Best' firms are more likely to measure the success of their NPD efforts. However, formal performance tracking measures were still not considered important and respondents indicated commercial success was one of the main indicators of a successful NPD programme within the firm. Many felt that this dimension could become increasingly important in the coming years as firms gain better understanding of NPD performance measurement models.

10.3 NPD Best Practices

The study also considered the characteristics of the seven dimensions of NPD. Respondents were asked to review those characteristics and indicate whether they reflected a Poor, Good, Better or Best NPD practice. The US, UK and Ireland samples indicated that poor practices were more well-known than best practices were each of the seven dimensions. The NZ sample was consistent across the seven dimensions for both poor and best practices although strategy, process and research dimensions had more listings of poor practices. However, the difference was negligible. There was one significant difference between NZ results and those from the US, UK and Ireland. NZ professionals identified best practices for the Metrics dimension. This indicated that even though Metrics as a dimension ranked the lowest among the seven for NZ professionals, there was an awareness of the characteristics that constitute best and poor practices for this dimension.

Given that the success rate of new products worldwide has been low, increasing understanding of what drives new product success is critical (Ledwith and O'Dwyer 2009). There was overall, a greater understanding of the poor, good, better and best practice characteristics associated with each of the seven dimensions. Even though the literature on the study of best practices in New Zealand could be considered scarce, the study seemed to indicate that NZ professionals were aware of the poor and best practices of NPD.

10.4 Limitations of the Study

The research into the importance of the seven dimensions of NPD has produced results consistent with those from the US, UK and Ireland. There were, however, certain limitations to this study. The sample size, even though it attained normality, may be considered too small to reflect the overall trends and best practices in NZ companies. However, this limitation was partially addressed by follow-up calls to the respondents and qualitative research to ascertain the

rationale behind their responses. The possibility of a biased sample due to self-selection cannot be ruled out. Even though, the survey was designed to elicit the poor and best practices of the company as a whole, individual bias towards certain practices cannot be ignored.

11. COMMENTS AND FEEDBACK

Respondents were also asked for their comments with regards to each section and also with regards to the characterisation of poor, good, better and best practices listed under each of the seven dimensions. Some of their responses are presented below.

11.1 IMPORTANCE OF STRATEGY

"*A formal strategy helps reduce processing time. It is important to involve the top management in the NPD process to reduce the time taken to make decisions".*

Involving the top management in the NPD process appeared to be easier in SMEs as there was no dedicated NPD team in most cases and this meant management was involved in the whole NPD process right from the start. This reduced the time taken to make important decisions at different stages of a NPD process making the company more agile.

"We value strategy as an important aspect of a product development process and hence we have included that in our vision statement"

"For a NPD process to succeed, there should be well-defined NPD goals and long term strategic support for NPD projects".

If NPD was part of the company's mission/vision statement, it becomes easier to maintain long term support even through changes in management mid-way through a project.

The comments below were in response to a question about the best practices of NPD. The first respondent felt that NPD is more of a value-add to an existing product line.

"With any commodity, your volume is in the bulk product. The NPD that you do on top of that is usually value added, so the company is still innovative, and always looking for new ways to deliver a great product."

"Don't forget the serendipity aspect associated with NPD - very often new products developed by sheer luck and then it's up to the skill of the researcher to figure out that they do in fact have a new product or something with that potential."

11.2 COMMENTS ON QUESTIONNAIRE

"Overall I find the questions leading and predictable and theoretical and far removed from the reality of the common small to medium size business in NZ. The framework referenced against would only apply to a few large companies."

Although some of the questions may not apply to SMEs, the author is of the opinion that a majority of them do apply. For example, even though SMEs may not have a standard NPD process, they can still have a long-term NPD strategy or a performance measurement tool.

The comment below was in relation to the poor, good, better and best ratings for the NPD characteristics identified in the survey.

"The ratings mentioned below have been specified for an ideal situation or company. The ratings do not reflect this organisation's practice or methodology."

"I found this quite difficult to fill out particularly since my company is focused mainly at the development end of this rather than the commercialization, this

being usually the clients concern."

The comment below related to Part 3 of the survey which asks respondents to identify the poor, good, better and best practices listed under each of the seven dimensions.

"The questions are leading and set up with inbuilt judgments. Not very good for a survey at all. It seems to be all about regimented planning and control which may suit a big company, but it does not suit agile small companies at all that need to react fast to opportunities".

The respondent argued that the characteristics were quite leading which may be true but we were trying to identify those characteristics that were considered good, better or best. Agile companies may not follow a particular process and hence may have the ability to react to a new market scenario better than companies that follow a regimented process that is not geared to meet the same.

11.3 CHARACTERISTICS OF NPD PROCESS

Some of the respondents suggested additions to the existing characteristics of the seven NPD dimensions during interviews to ascertain their views on the importance of each dimension. They have been listed below under each dimension.

Strategy

- *Company has a well-defined mission, vision and value statement*
- *Continually changing strategy/goals*
- *Frequent knee-jerk reprioritization*

Company Culture

- *If management focuses too much on cost-saving activities, it could lead to unnecessary delays in product development. There must be a trade-off between cost-saving activity and speed to market.*

Process

- *NPD process exists but is not followed because of a lack of understanding*
- *NPD process is not followed by every department in the organisation.*

Project Climate

- *NPD personnel are also involved in fire-fighting projects*

Research

- *Decisions are made using objective, and not, subjective data (eg: projected sales volume is based on concrete data citing real market research and not historical or subjective info.*

Commercialisation

- *Even after the launch of the new product, there is a regular promotion of the product via ads and special deals, for example.*

12. CONCLUSIONS

Strategy was considered the most important of the seven dimensions identified in this research. This would suggest that companies need to have a strong NPD strategy tied in with their mission/vision statement. Metrics ranked the lowest. This was consistent with findings from the US, UK and Ireland. But this dimension may gain more importance over the coming years as companies gain a better understanding of measuring their new product development practices and successes. However, respondents were aware of the poor and best characteristics associated with the metrics dimension. This suggested that although there was general awareness about this particular dimension, it did not merit sufficient investment. The small size of New Zealand companies may not warrant a standard NPD process as smaller, agile companies can better adapt to changes in market situations than bigger companies. There was also a general understanding of the poor, good, better and best practices associated with each of the seven dimensions of NPD identified in this research.

Overall, the survey was received positively. However, as the comments and feedback section indicated, some of the respondents felt that some sections of the survey were quite complex and some of the questions were more suited to big companies rather than SMEs.

12.1 RECOMMENDATIONS

The research indicated that there was general awareness or understanding of the poor, good, better and best characteristics of NPD in New Zealand. However, further research would be required to determine the extent to which these best practices are being applied. This could involve case studies of one or more small to medium enterprises.

A comparison of large enterprises and SMEs around their NPD practices and their perceived importance of the seven dimensions of NPD practices identified in this research would be a useful study. The research could be further extended to compare large companies in the US with those in New Zealand. This could provide opportunities to explore the importance of process in large companies and whether there are any differences in the way some of the seven identified dimensions are applied.

The research suggests that SMEs would be well served by including product development and/or its elements as part of the company's mission statement. Support for product development activities should be inculcated in to the company culture and start from the top. As the research indicated, it is important to have a clear product development strategy and the management should champion its cause. Process did not rank highly among the SMEs involved in this research. However, this aspect of new product development should not be ignored completely. Although it has been suggested that SMEs being small and agile tend to make decisions on the go and a formal process may not be necessary, it is recommended that companies have a formal process in place to cover any eventuality.

There seemed to be a greater awareness of strategy, research, process and commercialisation among the SMEs involved in the research but not so much about metrics. Metrics and performance measurement is an area that SMEs should work on. It is important to have tools to measure product development success in order to improve on shortcomings. This is an area of NPD that might warrant more work in the coming years.

Appendix I: Letter to Respondents

Dear Respondent:

The following survey is an important part of a research study on seven dimensions of New Product Development (NPD) best practices being conducted by Sushrutha Metikurke of Massey University. A total of 30 completed responses are necessary for reliability and validation purposes and so your taking the time to fill out this short survey is crucial to the successful completion of the study towards clarifying NPD best practices. Based on pretests, it should take no longer than 15 minutes to complete the survey's three parts:

- *PART ONE: asks for information about your company and its industry, your NPD experience, and your perception of NPD success.*

- *PART TWO: asks for you to evaluate seven defined dimensions of NPD practice and provide relative importance weightings for each dimension.*

- *PART THREE asks for you to evaluate characteristics of a particular NPD dimension by indicating whether each given characteristic reflects a poor, good, better, or best NPD practice.*

All responses will remain confidential. If you are interested in receiving an executive summary of study findings, please provide us with your business card separately.

Thank you very much for your time and assistance.

Sincerely,

Sushrutha Metikurke

Appendix II: Part One and Two of the Survey

PART ONE

1. How many years of NPD work experience do you have? _____ years

2. What functional area / department do you represent within your company?
_____

3. Please identify your industry sector (check one):

Raw Materials Sector _____ Agriculture _____ Mining	*Other Sector* Please specify:
Service Sector _____ Arts, Entertainment, and Recreation Services _____ Construction _____ Education _____ Financial and Insurance Services _____ Hotel, Accommodation, and Food Services _____ Medical and Health Care Services _____ Professional, Technical, & Mgt. Consulting _____ Real Estate and Rental and Leasing _____ Retail Trade _____ Telecommunications & Information Services _____ Transportation and Warehousing _____ Utilities _____ Wholesale Trade _____ Other Service	*Manufacturing Sector* _____ Food and Beverage Manufacturing _____ Tobacco Products Manufacturing _____ Textile and Apparel Manufacturing _____ Wood, Paper Products, & Furniture Manufacturing _____ Chemical, Petroleum, & Coal Products Manufacturing _____ Plastics and Rubber Products Manufacturing _____ Nonmetallic Mineral Product Manufacturing _____ Primary Metal Manufacturing _____ Fabricated Metal Product Manufacturing _____ Machinery Manufacturing _____ Computer and Electronic Product Manufacturing _____ Electrical Equipment and Appliance Manufacturing _____ Automobile, Boat, & Other Transportation Equipment Mfg. _____ Other Manufacturing

4. Please identify the type of market served (check one):
   _____ Primarily Consumer Markets
   _____ Primarily Business-to-Business Markets
   _____ Both Consumer and Business-to-Business Markets
   _____ Other (please specify _____)

5. Approximately what % of your company unit sales are generated by products introduced in the past five years? _____%

6. Annually what do you think would be the optimal % for your company in terms of % of unit sales generated by products introduced in the past five years? _____%
7. Approximately what is the size of your company in terms of number of employees (check one)?

_____ Less than 5 employees
_____ Between 5 and 10 employees
_____ Between 11 and 50 employees
_____ Between 51 and 100 employees
_____ Between 101 and 250 employees
_____ Between 251 and 500 employees
_____ Between 501 and 1000 employees
_____ Over 1000 employees

8. Approximately, what is your company's annual sales in NZ$ (check one)?

_____ Less than $1 Million
_____ $1 to $5 Million
_____ $5 to $10 Million
_____ $10 to $20 Million
_____ $20 to $30 Million
_____ $30 to $40 Million
_____ $40 to $50 Million
_____ Over $50 Million

PART TWO

Seven dimensions of NPD practice are STRATEGY, PROCESS, RESEARCH, PROJECT CLIMATE, COMPANY CULTURE, METRICS & PERFORMANCE MEASUREMENT, and COMMERCIALIZATION. We define them as follows:

- STRATEGY: the defining and planning of a vision and focus for research and development, technology management, and NPD efforts at the SBU, division, product line and/or individual project levels, including the identification, prioritization, selection, and resource support of preferred projects.

- PROCESS: the implementation of NPD stages and gates for moving products from concept to launch coupled with those activities and systems that facilitate knowledge management for NPD projects and the NPD process.

- RESEARCH: the application of methodologies and techniques to sense, learn about, and understand customers, competitors, and macro-environmental forces in the marketplace (e.g., focus groups, mail surveys, electronic surveys, ethnographic study).

- PROJECT CLIMATE: the means and ways that underlie and establish NPD intra-company integration at the individual and team levels, including the leading, motivating, managing, and structuring of individual and team human resources.

- COMPANY CULTURE: the company management value system driving those means and ways that underlie and establish NPD thinking and NPD collaboration with external partners, including customers and suppliers.

- METRICS & PERFORMANCE MEASUREMENT: the measurement, tracking, and reporting of NPD project and NPD program performance.

- COMMERCIALIZATION: activities related to the marketing, launch, and post-launch management of new products that stimulate customer adoption and market diffusion.

Relative to each other, indicate how important each dimension is in terms of percent importance weighting. The sum of these importance weightings should sum to 100%

DIMENSION	IMPORTANCE WEIGHTING
STRATEGY	= _____ %
PROCESS	= _____ %
RESEARCH	= _____ %
PROJECT CLIMATE	= _____ %
COMPANY CULTURE	= _____ %
METRICS & PERFORMANCE MEASUREMENT	= _____ %
COMMERCIALIZATION	= _____ %
	100%

Appendix III: Part Three of the Survey

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

STRATEGY: the defining and planning of a vision and focus for research and development, technology management, and NPD efforts at the SBU, division, product line and/or individual project levels, including the identification, prioritization, selection and resource support of preferred projects.

	NPD Level of Practice			
	Poor	Good	Better	Best
Clearly defined and organisationally visible NPD goals				
Funding drives NPD project selection and development				
A product road map is in place				
The organisation views NPD as a long term strategy				
Mission and strategic plan help define strategic arenas for new opportunities				
Most NPD projects fit with mission, but some pet projects that do not fit mission exist				
No NPD goals				
NPD goals are clearly aligned with organisation mission and strategic plan				
NPD projects and programs are reviewed on a regular basis				
NPD projects are identified during budget process and resources allocated accordingly				
Opportunity identification is ongoing and can redirect the strategic plan real-time to respond to market forces and new technologies				
Organisational mission and strategic plan drives NPD project selection				
The organisation views NPD only as a short-term tactical initiative				
Unclear NPD goals				
A formal and systematic portfolio management process is in place				
A portfolio management process is used to manage existing offerings				
A variety of NPD projects are supported with little to no regard for mix appropriateness				
All projects are aligned with the organisation's mission/strategic plan				
No concern over types of NPD projects being developed				
No prioritization of NPD projects				
No process for undertaking portfolio management				
NPD concepts/project ideas are reviewed individually and independently				
NPD project prioritization occurs during the annual budget process				
NPD projects may or may not be aligned with organisation's mission / strategic plan				
Pet projects are prevalent				
Resources can be made available should a new opportunity come onto the horizon				
There is a ranking or prioritization of projects				
There is keen consideration for balancing the number of projects and				

available resources				
NPD projects are evaluated relative to other projects in a portfolio				
All trade-offs amongst NPD projects are made informally with no set criteria				
Very few, if any, pet projects exist unless approved by management				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

COMPANY CULTURE: the company management value system driving those means and ways that underlie and establish NPD thinking and NPD collaboration with external partners, including customers and suppliers.

	NPD Level of Practice			
	Poor	Good	Better	Best
Top management supports the NPD process				
NPD is not a management priority				
The company pursues co-development activities with suppliers				
The company actively works with customers to develop new solutions				
There is a supportive NPD culture within the organisation				
Resources are made available for personnel to pursue novel ideas				
Our NPD culture embraces the concept of open innovation				
All NPD ideas come from within the company				
Supplier ideas can lead to new NPD projects				
Customer ideas can lead to new NPD projects				
New products are developed with global markets in mind				
New products involve global partners				
Risk-taking NPD endeavors are encouraged by management				
Entrepreneurial thinking is encouraged by management				
Corporate management encourages knowledge sharing across different SBUs				
An innovation culture pervades the organisation				
Competitor products can lead to NPD projects				
Management is primarily focused on operational efficiency and cost-savings				
Management emphasizes revenue and financial targets				
Employee new product ideas are rewarded				
Management encourages employees to submit and advance new product ideas				
Management rewards and recognizes entrepreneurship				
Project leaders are not penalized if their new product project fails				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

PROCESS: the implementation of NPD stages and gates for moving products from concept to launch coupled with those activities and systems that facilitate knowledge management for NPD projects and the NPD process.

	NPD Level of Practice			
	Poor	Good	Better	Best
A common NPD process cuts across organisational groups				
A few standard criteria are used to evaluate NPD projects				
Criteria for evaluating NPD projects are not defined				
Documentation on the NPD process is available				
Go/No-Go criteria are clear and pre-defined for each review gate				
An idea database is maintained				
Idea generation is structured and formal				
Informal, decentralized NPD process exists where different groups use their own tailored process				
Limited documentation on the NPD process exists				
Minimal testing (concept, product, market) performed				
No NPD process exists				
One formal stage-gate type process is employed for the entire organisation				
One individual or group can be readily identified as the process manager				
Personnel are very disciplined in using the process to develop all new offerings				
The NPD process is flexible and adaptable to meet the needs, size, and risk of individual projects				
The NPD process is visible and well-documented				
There is no discipline in using the organisation's NPD process				
There is an intranet for NPD process documentation				
There is no NPD process owner or NPD process champion				
Time critical projects may skip stages of process				
An IT infrastructure with appropriate hardware, software, and technical support is available to all NPD personnel				
Not all NPD personnel have access to the same IT tools (software, hardware)				
Projects are not reviewed at completion				
Knowledge of projects is stored and available to NPD personnel				
Project management software and techniques are used to manage projects				
The NPD process can be circumvented without management approval				
A clear NPD process exists				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

PROJECT CLIMATE: the means and ways that underlie and establish NPD intra-company integration at the individual and team levels, including the leading, motivating, managing, and structuring of individual and team human resources.

	NPD Level of Practice			
	Poor	Good	Better	Best
A NPD group exists and is dedicated to just NPD work				
Champions exist for each project, but are not necessary for project success				
Product champions are critical for project success				
Cross-functional teams underlie the NPD process				
Each project has a core cross-functional team which remains on the project from beginning to end				
Each project has a clearly identifiable project leader				
No identifiable NPD group				
No NPD teams but cross-functional meetings are used to discuss new ideas/projects				
No project leader(s)				
Not all projects go through NPD group; some projects are simply handled by department managers				
NPD personnel support each other in getting projects completed				
NPD is decentralized within each business unit/department				
NPD is team-focused				
NPD personnel are provided with NPD process training				
NPD personnel are involved in too many projects				
Creativity is an important characteristic of NPD personnel				
Team rewards are used to reward successful projects				
Functional departments and SBUs collaborate on NPD efforts				
Functional areas only support those ideas which they originated				
Interaction and knowledge transfer between functional areas is poor				
NPD personnel share a common objective in executing the NPD process				
Formal communication between functional areas is the predominant means of communication				
Informal communication between functional areas is the predominant means of communication.				
NPD activities between functional areas are coordinated through formal and informal communication.				
Functional areas work extremely well together on NPD activities				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

METRICS AND PERFORMANCE MEASUREMENT: the measurement, tracking, and reporting of NPD project and NPD program performance.

	NPD Level of Practice			
	Poor	Good	Better	Best
A software tool is employed for NPD performance measurement				
Board of Directors must approve really new ideas/projects and/or big projects				
Business plans must be approved by Directors, VP's				
Formal business analysis is undertaken				
Metric data can be readily accessed for analyses				
Metric data is tracked and stored				
Multiple review points exist				
Multiple reviewers are used to evaluate NPD projects and NPD progress				
No standard criteria for evaluating NPD projects exist				
No standard criteria for evaluating the overall NPD effort exist				
One person does all NPD project evaluations				
Projects are never killed				
Revenue is the predominant metric for NPD project success				
Scoring models / checklists are used				
Some initial screening criteria are used but very informal in nature				
Some projects may be killed/dropped				
A team approach is used to evaluate and make final decision on NPD projects				
A set of general guidelines for evaluating projects exists				
There is a group charged with the task of evaluating NPD projects				
There is a standard set of criteria for individually evaluating NPD projects				
There is standard set of criteria for evaluating the overall NPD effort				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

RESEARCH: the application of methodologies and techniques to sense, learn about, and understand customers, competitors, and macro-environmental forces in the marketplace, including focus groups, paper-based surveys, electronic surveys, and ethnographic study.

	NPD Level of Practice			
	Poor	Good	Better	Best
A formal market research function exists in the organisation				
Ongoing market research is used to anticipate/identify future customer needs and problems				
Concept testing, product testing, and market testing are used in some, but not all NPD projects				
Concept, product and market testing is consistently undertaken and expected with all NPD projects				
Customer/user is an integral part of the NPD process				
Customer/user is uninvolved in NPD process				
Market research focuses on current customer needs and problems				
Market research is an integral part of NPD activity				
Market research is budgeted				
Voice of the customer studies are used regularly				
Future customer needs are given attention				
Customer complaint, comment data is reviewed				
Six Sigma studies are used regularly				
Market studies are performed only at the beginning of a project				
No market research function exists within organisation; primary market research is outsourced				
Little if any market research is undertaken				
No real evaluation of testing (concept, product, market) results is undertaken				
No market studies are undertaken to understand marketplace				
Pilot testing is the predominant form of testing undertaken				
Product definitions are based on market research with customers/stakeholders				
Results of testing (concept, product, market) are formally evaluated.				
Subject matter experts are employed for macroenvironmental research				
There is a keen focus on analyzing competitors and their offerings				

Thank you for your time and assistance.

PART THREE

Below is a listing of characteristics for one of the seven NPD dimensions. Review each of the below characteristics and indicate whether that characteristic would reflect a POOR NPD practice, a GOOD NPD practice, a BETTER NPD practice, or BEST NPD practice. Feel free to make comments in the margin and/or on the back of this page.

COMMERCIALIZATION: activities related to the marketing, launch, and post-launch management of new products that stimulate customer adoption and market diffusion.

	NPD Level of Practice			
	Poor	Good	Better	Best
A Sales and Operations Planning (S&OP) process exists				
The launch team is cross-functional in nature				
The NPD process is tied to the S&OP process				
The sales force drives launch activities				
Supply chain management is involved in launch decisions				
Marketing budget decisions can dramatically change up to the point of launch				
Interdepartmental committees are employed for launch planning				
The NPD project team is not the same as the product launch team				
A liaison is established between development and launch teams				
Cross-functional teams make decisions concerning manufacturing, logistics, marketing, and sales				
One department is assigned to lead the launch process				
A project post-mortem meeting is held after the new product is launched				
Logistics and marketing work closely together on new product launch				
Sales force training is an important consideration before launch				
Everyone on the launch team is privy to the new product's promotional campaign				
Customer service and support are part of the launch team				
A launch team is established and responsible for launch planning activities				
A standard protocol for planning a launch exists within the company				
A launch schedule is publicized throughout the company				
Launch decisions are kept confidential by the launch team due to fear of public announcement				
Prior to launch, various market tests are used when possible				
Policies for returns and replacement are considered				
A launch process exists				

Thank you for your time and assistance.

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