THE IMPACT OF NEW PRODUCT STRATEGIES OF AUSTRALIAN FIRMS

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The more information available regarding elements of successful product innovation strategies, the more able are the managers of Australian industry to meet the challenges and opportunities of the international marketplace. To provide some understanding of the new product strategies of Australian firms, research was undertaken to determine performance results achieved by 108 firms in their new product programs, to determine whether firms' performance results are linked to their new product strategies, and to analyze the implications for product innovation management. The results indicate the importance of types of products developed, types of markets sought, technological and production strategies and nature and orientation of the firms' new product programs as elements of successful product innovation management.

Keywords: New product strategy; innovation management; Australian industry.

INTRODUCTION

Product innovation is widely recognised as central to the success of most companies. New products can contribute to company growth, can lead to increased profits and play a crucial role in business planning. Revitalisation of Australia's manufacturing sector will depend crucially on the ability of firms to produce quality products which are valued on world markets. In view of the high levels of product obsolescence expected during this decade in the mature product markets in which Australia competes with the rest of the world, its manufacturing sector must pay more attention to the production of new materials, products and devices and improvement of current product offerings.[1]

Product innovation is essentially an interdisciplinary activity requiring input from top management, scientific, technical, marketing, finance, sales and other personnel. Successful product innovation depends on a variety of factors including the nature and quality of information acquired or known during the new product process, the proficiency of process activities, characteristics of the marketplace, the compatibility of the resource base of the firm with new product project requirements,

* The research for this paper was made possible by the award of a grant from the Research Board, University of Western Sydney. The authors wish to acknowledge the constructive comments of two anonymous referees, whose suggestions have lead to improvements in the paper. The authors alone are responsible for any errors in the paper.

the level and complexity of the technology used, organisational structures of the firm, and innovativeness of the product.[2] Although some research has recently been undertaken to determine the elements of successful product innovation of Australian firms[3] much more needs to be done in this area, particularly in respect of the role of new product strategies in overall corporate plans.

To provide some understanding of the new product strategies of Australian firms, research was undertaken with the following aims:

i) To determine the performance results of firms' new product programs;
ii) To determine whether firms' performance results are linked to their new product strategies; and
iii) To assess the implications of the results for managers of business enterprises.

METHOD

Firms known to be active in new product development were selected at random from the 1988 Directory of Research and Development in New South Wales, a publication of the New South Wales Science and Technology Council. The nominated contact person for each firm was telephoned, given information about the aims of the project and invited to receive a pre-tested questionnaire to be completed and returned by mail to the researchers. The contact person, typically an R&D or marketing manager, was asked to ensure that the questionnaire was completed by a person with intimate knowledge of the firm's product innovation strategies. As for any survey which elicits human responses the results from the questionnaire must be treated with caution. Different persons within the one firm might give different responses and errors of interpretation are always possible. Questionnaires were sent to 175 firms from which 108 were completed and returned; i.e., a 62 per cent response rate.

To provide a structure to the research the authors employed a number of the same strategy variables as did Cooper in his important investigations of Canadian firms' product innovation strategies.[4] As Cooper acknowledges, his framework is based on normative strategy literature, on previous research into the determinants of new product success and failure and on previous studies of firms' new product strategies.[5] Accordingly, the questionnaire requested respondents to describe their firm's new product strategies on each of 66 characteristics which fall into the following four blocks:

i) Nature of Products Developed (16 measures)
Managers were asked about the types of new products they develop, their level of innovativeness, the type of differential advantage sought, and their 'fit' with the firm's existing product lines.

ii) Nature of New Product Markets Sought (20 measures)
Managers were asked about the types of markets targeted, market size and potential, market growth, the competitive situation, domestic versus export orientation, stage of product life cycle, and nature of customer needs.

iii) Nature of Technology Employed in New Product Development (11 measures)
Managers were asked about the types of production and development technologies used: concentrated versus diversified, technological maturity, synergy with the firm's technology base, compatibility with firm's engineering skills, R&D skills, and production skills.

iv) Orientation and Nature of the New Product Program (19 measures)
Managers were asked to indicate the direction, nature and commitment to new product development: offensive vs. defensive, pro-active vs. reactive, market vs. technologically driven, and pure vs. applied research.

Respondents were asked to indicate the performance of their firm's new product programs along several measures. There is no single criterion of new product program performance. A number of different measures have been proposed.[6]

In the present study the following performance measures were used:

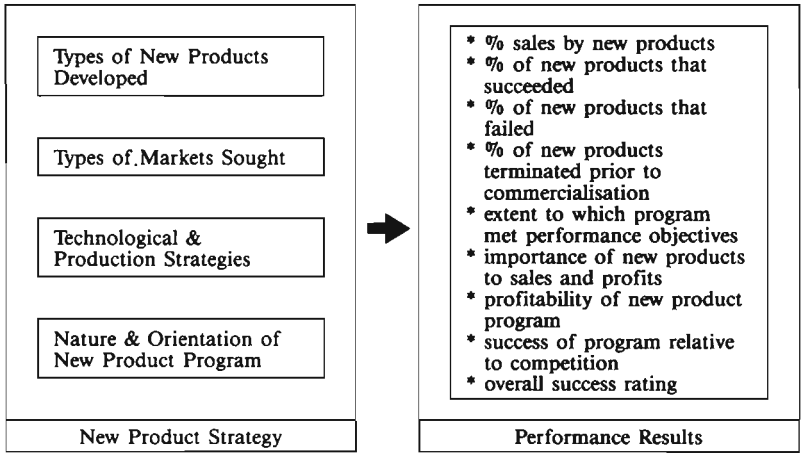
- The percentage of sales by new products over the last five years.
- The percentage of new products that succeeded, failed, or were terminated prior to commercialisation.
- The extent to which the firm's new product program met performance objectives.
- The importance of new products to sales and profits.
- The profitability of the new product program.
- The success of the firm's new product program relative to those of competitors.
- An overall success rating for the firm's new product program.

The last five variables were measured on an anchored 1-9 scale. Respondents estimated the performance of their firms' new product program from 1 (lowest) to 9 (highest), with 5 regarded as satisfactory.

The underlying hypothesis of the investigation is that firms' new product strategies determine the performance of their new product programs. The conceptual framework for the study is represented in Figure 1.[7]

It is hypothesised that the performance results of firms are influenced by the types of new products developed, the types of markets sought, technological and production strategies and the nature and orientation of the new product program.

Figure 1: A Conceptual Framework for the Study
New Product Strategy is linked to Performance Results



PERFORMANCE OF FIRMS' NEW PRODUCT PROGRAMS

Performance Results

Information was obtained on new product strategies and performance results for firms comprising several industry groups. The profile of firms by industry is set out in Table 1.

TABLE 1
PROFILE OF FIRMS BY INDUSTRY

ASIC Class*	*Industry*	*No. of Firms*	*% of Sample*
638	Business Services	21	19
335	Appliances & Electrical Equipment	19	18
270	Chemical, Petroleum, Coal Products	14	13
336	Industrial Machinery & Equipment	12	11
210	Food, Beverages	8	7
334	Photographic, Professional & Scientific Equipment	8	7
310	Fabricated Metal Products	7	7
320	Transport Equipment	3	3
347	Plastic Products	3	3
—	Other Manufacturing (including footwear, wood products)	13	12
	Total	108	100

* *Australian Standard Industry Classification*

As indicated in Table 1, firms involved in business services, particularly computer services, were the largest group among the respondents, followed by firms manufacturing appliances and electrical equipment, chemicals, petroleum and coal products, industrial machinery and equipment, food and beverages, photographic, professional and scientific equipment, fabricated metal products, transport equipment and plastics. The sample of firms covers significant industry groupings within Australian manufacturing industry. Responses regarding new product strategies come from a number of different industries with no single industry dominating the sample.

TABLE 2
NEW PRODUCT PERFORMANCE

PERFORMANCE CRITERION	ALL FIRMS		
	Mean	*Percentage of New Product Programs*	
		Below Mean	*Above Mean*
% sales by new products over last five years	50.9	58	42
% of new products that succeeded	68.9	36	64
% of new products that failed	15.5	60	40
% of new products terminated prior to commercialisation	16.1	68	32
		*Less than Satisfactory**	*More than Satisfactory**
Extent to which program met performance objectives	5.8	27	65
Importance of new products to sales and profits	6.6	18	74
Profitability of new product program	5.9	17	67
Success of program relative to competitors	6.5	8	79
Overall success rating	6.6	11	81

** These five variables were measured on a scale from 1 (lowest) to 9 (highest), with 5 regarded as satisfactory. The two columns do not add to 100 because of the satisfactory responses (scored as 5).*

Table 2 summarises the performance results of the firms in the sample. The firms on average derived half of their current sales from products introduced over the last five years, with the majority of firms (58 per cent) falling below the mean. The new product success rate is fairly high (69 per cent) relative to the failure and kill rates (aggregate 32 per cent), but note that these results are for developed products.

The other performance criteria were measured on a one-to-nine scale with five representing satisfactory performance. On all performance criteria the firms surveyed, on average, rated satisfactory or better. The highest mean ratings (6.6) were attached to overall success and importance of new products to sales and profits, with 81 per cent and 74 per cent of firms indicating better than satisfactory results on each performance measure respectively. The lowest mean ratings were attached to the extent to which the program met performance objectives (5.8) and profitability of the new product program (5.9), with 65 per cent and 67 per cent of firms indicating better than satisfactory achievement on these two performance measures.

Dimensions of new product performance

Data were collected on a number of measures of the performance of firms' new product development programs. These measures have been found to capture different facets of a firm's new product performance.[8] There is not a single dimension to new product performance, but rather a number of separate indicators of performance. The analysis attempted to consider whether these data also indicated that there are a number of dimensions to new product performance.

A factor analysis (varimax rotation, SAS routine) was carried out to reduce the performance measures to a set of independent factors. The factor analysis yielded three clear and easily interpreted dimensions which explained 75.4 per cent of the variance in the performance measures. The details of these factors are set out in Table 3.

TABLE 3
DIMENSIONS OF NEW PRODUCT PERFORMANCE

Factor Name (% of variance explained prior to rotation) (Total 75.4%)	*Variables Loading on Factor*	*Variable Loadings*
Overall Program Performance (42.7%)	Program met performance objectives	0.86
	Overall success rating	0.85
	Success of program relative to competitors	0.75
	Profitability of program	0.66
New Product Success Rate (16.8%)	% of new products that were terminated	−0.94
	% of new products that succeeded	0.87
Program Impact (Importance to Firm) (15.9%)	% of current sales by new products	0.89
	Importance of new products to sales and profits	0.82

The three dimensions of new product performance, which are very similar to those of the Canadian study undertaken by Cooper,[9] are —

i) Overall Performance: variables loading on this factor were program met performance objectives; overall success rating; success of program relative to competitors; profitability of program (Cooper's analysis also included the variable importance of program to sales and profits in this factor).
ii) Success rate: variables loading on this factor were the percentage of new products which succeeded and the percentage of new products that were terminated prior to market launch (This factor comprises the same two variables as found by Cooper).
iii) Program impact: variables loading on this factor were the percentage of current sales by new products and the importance of new products to sales and profits (This factor comprises the same two variables as found by Cooper).

The existence of three independent indicators of performance has important implications. First, new product performance cannot be looked at in a single, simple way. Managers must take into account the different dimensions of performance. Second, these three dimensions of performance are independent of one another. Success in one performance dimension does not ensure success in the remaining two. Further, the determinants of success, and hence strategies adopted, may be different for the different dimensions.

NEW PRODUCT STRATEGY SCENARIOS

Strategies impacting on different performance criteria

The impact of each of the 66 strategy variables on overall program performance, new product success rate and program impact was examined using correlation analysis. These strategy elements were divided into four groups according to their relevance to the nature of new products developed, the types of markets sought, technological and production strategies and the nature of the new product process. Only those elements of firms' new product strategies which had a statistically significant impact (at least at the 10 per cent level) are shown in Table 4.

Achieving High Overall Performance

High overall performance was associated with the following strategies:-

- development of new products which are of higher quality than those of competitors but which have a similar function (or end-use) to the firm's existing products and fit into existing product lines.

TABLE 4
IMPACT OF STRATEGIES ON NEW PRODUCT PROGRAM PERFORMANCE

Strategies	*Overall Performance*	*Success Rate*	*Impact on Firm*
1. Types of New Products Developed	• similar function (end-use) as existing products (0.25) • higher quality than competing products (0.19*) • fit into existing product lines (0.18*)	• big ticket items — high per unit price (0.17*)	• high technology products (0.31) • permit customer to do a unique task (0.28) • highly innovative — first on market (0.24) • offer unique features to customers (0.22) • same product class as existing products (0.18*) • priced lower than competing products (0.18*) • mechanically and technically complex (0.17*)
2. Types of Markets Sought	• fits well with firm's market research skills (0.29) • domestic market orientation (0.22) • fits well with firm's distributional channels/sales force (0.19*)	• new advertising/promotion approaches for firm (0.19*)	• new customers needs — that firm has not served previously (0.32) • closely related markets (focussed) (0.27) • mass markets — many customers (−0.26) • new customers — that the firm has not sold to previously (0.23) • rapidly growing markets (0.20) • fits well with firm's market research skills (0.20) • customer loyalty to competitors (0.18*) • export market orientation (0.17*)

Strategies	*Overall Performance*	*Success Rate*	*Impact on Firm*
3. Technological & Production Strategies	• fits well with firm's R&D skills/resources (0.30) • can be made with firm's production facilities (0.21) • fits well with firm's production skills (0.20) • fits well with firm's engineering skills (0.18*) • employ production technology well known to firm (0.17*)	• fits well with firm's engineering skills (0.28) • fits well with firm's production skills (0.26) • fits well with firm's R&D skills/resources (0.22) • can be made with firm's production facilities (0.20)	• employ sophisticated complex technology (0.28) • employ state of the art development technology (0.26) • employ development technology well known to firm (0.26) • employ closely related development technology (focused) (0.23) • employ state of the art production technology (0.22) • fits well with firms R&D skills/resources (0.20)
4. Nature and Orientation of New Product Program	• products that are high risk (−0.39) • active new product idea search (0.38) • R&D spending as a per cent of firms sales (−0.36) • proactive in identifying market needs for new products (0.35) • offensive (vs defensive) program (0.34) • leading edge of corporate strategy (0.27) • market research spending (on new products) as a per cent of firm's sales (−0.26) • strong marketing orientation (0.25) • market derived new product ideas (0.24)	• extensive use of market research for new products (−0.28) • technologically derived new product ideas (−0.17*) • products that are high risk (0.18*)	• R&D spending as a percent of firms sales (0.40) • strong R&D orientation (0.33) • dominated by scientific/technical personnel (0.29) • leading edge of corporate strategy (0.28) • offensive (vs defensive) program (0.25) • products that are venturesome (0.21) • proactive in identifying market need for new products (0.20*)

*Correlation coefficients are shown in brackets: * indicates significant at 10% level only; others are significant at 5% level.*

- aiming those products at markets which fit well with the firm's distribution channels/sales force, market research skills and advertising/promotion skills.
- development of new products which reflect technical fit, i.e., fit well with the firm's engineering, production and R&D skills/resources, which can be made with the firm's production facilities and which employ production and development technology well known to the firm.
- an offensive (vs defensive), strongly market and R&D oriented new product program that is at the leading edge of corporate strategy, which is proactive in identifying market needs for new products, involves an active, market derived new product idea search emphasising low risk products, and where market research spending is typically a low percentage of firm sales.

Achieving High Success Rate

High success rate was associated with the following strategies:-

- development of big ticket items with a high per unit price.
- use of new advertising/promotion approaches for the firm.
- development of new products which fit well with the firm's production, engineering, R&D skills, which can be made with the firm's production facilities.
- a new product program which does not rely on market research studies for new products.

Achieving High Program Impact

High program impact was associated with the following strategies:-

- development of mechanically and technically complex, high technology products which permit customers to do a unique task, which are highly innovative, offering unique features to customers, which affect the way in which customers use the products, which have a lower price than competing products.
- aiming those products at markets, including export markets where there are new customers and new customer needs but where there is synergy with the firm's market research skills.
- development of new products which employ sophisticated complex technology and state of the art development and production technology.
- an offensive (vs defensive) program with strong R&D orientation, dominated by scientific/technical personnel, and with relatively high R&D spending as a percentage of sales.

IMPLICATIONS FOR MANAGEMENT

The study has a number of implications for new products managers in Australian firms.

New product programs tend to succeed

The results from the sample of firms in this study show that new product programs which reach the development stage are generally successful. Overall, the mean success rate for developed products was 69 per cent.

New product performance was also rated positively on the other criteria of performance used. New products introduced in the last 5 years represented, on average, 51 per cent of the current sales of firms. On the scaled measures of performance, on average, firms scored on the positive side of the ratings. Scaled ratings, while averaging 5.8 to 6.6 showed high variations across firms. Some firms revealed unsatisfactory new product performance (a rating less than five).

The results show that most developed new products do succeed. Most new product programs contribute in a major way to the sales and profits of the firms sampled and most are perceived to be performing positively.

New product performance has different dimensions

Three dimensions of the new product performance of firms were identified: overall program performance, new product success rate and program impact. Although no single strategy leads to high performance on all three performance dimensions simultaneously, certain related elements are associated with high performance on two or more of its measures. The implications are that new product performance cannot be looked at in a simple clearcut way. Since the three dimensions of performance are independent of one another, success in one dimension does not ensure success on the remaining two. Management must realise that the determinants of success, and hence strategies adopted, may differ according to the performance goal.

Different strategies can achieve success on the different dimensions of performance

Identification of those strategic elements of firms which impact on performance criteria highlights the major strategies which can be employed to succeed on the different dimensions of performance.

Types of Products Developed

To achieve high overall performance the firm should develop new products which are of higher quality than competing products, have similar functions to the firms existing product offerings and fit into

existing product lines. To achieve high success rate the firm should develop big ticket items. To achieve high program impact firms should develop mechanically and technically complex products tailored to customer needs. They should be high technology products, competitively priced, innovative, offering unique features and meeting customer needs better than competing products.

Types of Markets Sought

While seeking markets which fit well with the firm's market research skills is associated with both high overall performance and high program impact, the results imply different strategies depending on the performance goal. To achieve high overall performance firms should seek markets which fit well with the firm's distributional channels/salesforce, and have a domestic market orientation. To achieve high success rate firms should attempt new advertising/promotion approaches for the firm. To achieve high program impact firms should seek out mass markets, export markets, new customers and new needs which the firm has not previously served.

Technological and Production Strategies

Strategies which fit with existing skills and which are compatible with the firm's resource base are important in achieving high performance on two performance dimensions. Employment of technological and production strategies which fit well with the firm's R&D skills/resources, production skills, engineering skills, which employ production and development technology well known to the firm and products which can be made with the firm's production facilities promote both high overall performance and high success rate. To achieve high program impact the firm should employ sophisticated and complex technology and state of the art production and development technology.

The importance of technology to the firms in the sample is reflected in the associations between high program impact and high technology products, highly innovative products, custom products offering unique features, employment of sophisticated, complex technologies, state of the art production and development technologies, high R&D spending as a percentage of firms' sales, a strong R&D orientation and a new product program dominated by scientific/technical personnel.

Nature and Orientation of New Product Program

To achieve both high overall performance and high program impact firms should adopt an offensive (vs defensive) new product program. and be proactive in identifying market needs for new products. For high overall performance the firm's new product program should be at the leading edge of corporate strategy, with low R&D spending as a per cent of firm's

sales, and new products should be low risk. Having a strong marketing orientation was much more important for achieving high overall performance than for high program impact where high R&D spending relative to sales and a technical or scientifically driven program were important factors.

Importance of 'Corporate Fit'

Corporate fit refers to the degree of fit between the firms' existing resources and skills strengths (including managerial and financial capabilities) and the strategies adopted to promote corporate objectives. Elements of technical corporate fit relate to the compatibility of the firm's technological and production strategies to their resource base and the degree to which the firm's R&D, engineering, production capabilities can support its new product strategies. Elements of market corporate fit relate to the compatibility of the firm's sales and distribution strategies to its resource base and the degree to which its market research, sales, distribution, advertising and promotion capabilities can support its new product strategies.

Elements of corporate fit are associated with good performance on each of the measures. High overall performance is associated with types of markets which fit with the firm's market research skills, advertising/promotion skills and distribution channels and with technological and production strategies which fit well with the firm's R&D skills/resources and engineering and production skills. High success rate is associated with new products which fit into existing product lines, and with technological and production strategies which fit well with the firm's R&D and engineering skills. High program impact is associated with markets which fit well with the firm's market research resources.

If new product managers are to ensure that new product strategies are compatible with corporate resources strengths they must be able to assess corporate strengths and weaknesses, tailor strategies to corporate strengths, and complement corporate strengths with organisational structures which promote successful product innovation. The problems faced by management in these areas have been discussed elsewhere.[10]

CONCLUSIONS

The firms surveyed, on average, derived half of their current sales from products introduced over the last five years. The new product success rate is fairly high (69 per cent) relative to the product failure and kill rates. On other performance criteria the highest mean ratings (6.6) were attached to overall success and importance of new products to the firm's sales and profits. 81 per cent and 74 per cent of firms indicated better than satisfactory results in the latter two performance measures. The lowest mean ratings were attached to the extent to which firm's new

product programs met their performance objectives (5.8) and profitability of their new product programs (5.9) with two thirds of the firms indicating better than satisfactory achievement on these two performance measures.

It was also found that firms' performance results are linked to their new product strategies. Three independent dimensions of new product performance were revealed, viz., overall performance, success rate and program impact. Strategy implications were discussed regarding types of products developed, types of markets sought, technological and production strategies and the nature and orientation of the new product program. Although, as expected, no single set of strategy elements had a significant impact on all three performance criteria, those strategy elements associated with success on each criterion were identified.

The results should be of interest to new products managers of Australian firms. They show that new product performance has different dimensions and, that different product innovation strategies can achieve success on the different dimensions of performance. The findings also confirm the importance of elements such as product quality, market research, skills development, research and development and corporate fit in promoting corporate objectives.

If Australian business managers are to compete successfully in global markets best practice strategies must be adopted. Further research is required to explore in more detail the associations between strategy elements and success on the different dimensions of performance. The discussion here provides a framework for thinking about the new product development process in terms of types of products, markets, technological and production strategies, and orientation and nature of the new product program.

The implications of the strategy-performance link are critical to product innovation management. The existence of this link suggests that firms need to define clearly their new product strategy as an integral part of the corporate plan. The more attention paid to the promotion of successful product innovation, the more able are the managers of Australian business to meet the challenges and opportunities of the international marketplace.

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