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DETERMINING KEY SUCCESS FACTORS IN NEW PRODUCT DEVELOPMENT: EVIDENCE FROM MANUFACTURING COMPANIES IN MALAYSIA

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Abstract

This study examines key factors in new product development in Malaysia by providing empirical evidence on NPD practices and its determinants for success. Data were collected through a large scale mail survey from a cross-section of 185 Malaysian manufacturing companies spanning 9 industries sector. Using Factor Analysis and Pearsons Product Moment Correlation Analysis, key factors leading to successful NPD were determined. The findings from this study suggest that, critical areas, such as unique and technologically innovative products, marketing resources, research skills and proficiencies, efficient product launching, market information and strategic focus are important determinants to new product success. Since all these factors are within the control of management, managers can effectively manage them strategically in achieving success in NPD. These findings provide guidance for managers who are starting to embark on NPD or for managers to their search for better new product development success rate.

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INTRODUCTION

The notion that new products are crucial to the survival and growth of a company has been widely accepted (Booz, Allen and Hamilton 1968, 1982; Cooper 1976, 1984, 1986, 1987; Cooper and Kleinschmidt 1991). In fact new product is regarded as the organisation's life-blood, that nurtures and sustains its existence (Buggie 1981; Barclay and Benson 1990). The development resulting in new products will give an organisation the competitive edge to grow and survive alongside its competitors (Baker and Hart 1993). Organisational innovation allows company to gain market leadership, create new markets, change the manner of competition in their industry, or cause existing products to become obsolete. Corporate dependence on new products is becoming more intense particularly for firms operating in a turbulent business environment that may be caused by shortening product life cycles, rapid technological innovations, intense competitive pressures and unpredictable changes in consumer preferences. Continuous product innovation and development, therefore, is and will continue to be an integral part of the corporate strategy. Therefore, firms can no longer consider new product development (NPD) as a strategic option but a necessity (Craig and Hart 1992).

Over the past forty years, studies in the area of successful product development have been numerous (NICB 1964; Cooper 1979, 1980; Calantone and Cooper 1981; Booz, Allen and Hamilton 1982; Maidique and Zirger 1984; Cooper and Kleinschmidt 1986, 1987, 1990). But these studies however, have been principally conducted within the context of advanced industrialised economies. Very few studies have been attempted to understand the nature and practices of new product innovation and development in the industrialising economies. Involvement of companies in new product innovation and development in developing countries remain unclear. Many of the activities of firms in these countries have not been explored, particularly the methods of conducting new product innovation and the critical success factors in their development. It has not become obvious whether the attributes for successful product development in the industrialized economies also characterise firms in the industrializing economies. The focus of this paper is to determine the key factors that contributes to the successful development of new products in Malaysian manufacturing companies.

OBJECTIVES OF THE STUDY

The objective of this paper is to establish the factors that contribute to success in NPD. Significant issues relating to the techniques and procedures by which new products are conceived and introduced to the market as well as issues involving managerial responsibilities and planning in developing new products will also be investigated.

To achieve the above objectives, theories and practices of NPD of industrialized countries are reviewed and used as a basis for understanding NPD practices in Malaysia. This approach is taken because the theories and practices of NPD in western countries are deemed to be more developed due to their established and long-standing research and thus provides a broad-based framework from which to study NPD practices in Malaysia.

NEW PRODUCTS

Sampson (1970) offered a definition of a new product. According to him, a new product is one that:
- Satisfies new need, wants or desires,
- Possesses outstanding performance in such need satisfaction compared to other products, and
- Benefits from an imaginative combination of product and communication.

White (1976) defines new products based on a continuum of newness. On one extreme, new products can fall under the category of revolutionary products characterized by high novelty, radical breakthrough products and on the other, evolutionary products, characterized by low novelty.

In their study of new product introduction success, Booz, Allen and Hamilton (1982) propose 6 types of new products based on the degree of newness to the firm and market. These products include:
- radical products, i.e. products that are completely new to the world (10%).
- new product lines, i.e. products that are new to the organizations but not necessarily new to the markets (20%).

- additions to product lines, i.e. products that supplement an organization's established product lines (26%).
- modified products are existing products that have undergone some major or minor improvements (26%).
- repositioned products are existing products that are targeted to new market segments (11%).
- cost reduction products are new products that provide similar performance but at a lower cost (7%).

Other descriptions of new product are based from a consumer standpoint. It is argued that newness of a product depends on how customers perceive this product based on the attributes for which the product can be new to them. In this regard, products are new if it has improved performance, or have increased benefits from its use.

For the purpose of this study, a new product is one that is new to the firm. This definition means that the newness of a product is unaffected by the fact that other companies are marketing an identical product, or that consumers fail to perceive the product as new.

NEW PRODUCTS AND COMPANY SUCCESS

New and innovative products have been widely accepted as the cornerstone for economic growth and survival for corporation and nation (Booz, Allen and Hamilton 1963, 1982; Ughanwa and Baker 1986). The emphasis on innovation as a success factor has been well recognized such that Drucker (1955) elevated the role of innovation to be as critical and fundamental as that of a marketing function.

The significance of new products can be seen to affect an organisation in 3 major ways:
- A major contributor to company growth,
- A primary influence on profit performance, and
- A key factors in business planning.

Booz, Allen and Hamilton (1963) found that companies that spend an increased amount of capital on new product development tend to achieve greater rate of growth. A major proportion of this growth is attributable to sales and profitability of new products. This is evidenced by a survey in 1982 involving more than 700 U.S. manufacturing

companies and over 13,000 new products which indicates that new products contribute to an increase of over 30 percent in sales and 40 percent in the overall corporate profit.

New products contribution to profit performance can also be seen from the product life cycle (PLC) concept. The product life cycle describes a pattern of changes that most products go through from the point they are conceived until they are phased out from the market. A point will be reached when demand for the product will decrease especially towards the end of the maturity stage. This is due to changes in the market needs or competitors' actions. It is important at this stage for company to have alternative newer products to replace old ones where there would be a continuous flow of new products and phasing out of unprofitable ones.

A prudent product planning is important. The purpose is to provide firm direction for which organizational resources can be directed and to adjust company's resources according to the changing environmental conditions.

NEW PRODUCT DEVELOPMENT PROCESS

Product development is a process encompassing all activities involved in the creation, research, development and diffusion of products to the end users. Inherent in this process is the underlying management requirements needed to manage the process effectively.

New product development is also seen as a sequential process normally involving six distinct phases starting with the exploration, screening, business analysis, development, testing and ending with commercialisation. Formulated by Booz, Allen and Hamilton (1968), this activity-based new product development model has been used widely in many marketing textbooks and used as a guide for managers to ensure necessary steps in the product development process. As a guiding model, it has provided insights into the various stages of product development. However, it has been criticised for being somewhat arbitrary because it can be described in a variety of ways, with more or fewer stages involved. Furthermore, these series of activities may vary from company to company and from product class to product class (Pessemier, 1966).

There are however no one models that can describe fully the whole process adequately. Although the proposed Booz, Allen and Hamilton model had been of enormous help to managers especially as a check to see if all the essential tasks had been undertaken, in practice, new product process does not necessarily proceed in a linear sequential manner. Of late, new product development process is viewed as a series of parallel and interactive event (Takeuchi and Nonaka 1986; Cooper 1988a; Hart and Baker 1994).

THE DETERMINANTS OF NEW PRODUCT OUTCOME

There seems to be a defined pattern of research focus in what was investigated in these studies. Earlier studies investigated factors that are associated with success or failure in product development or technological innovation. The rationale for such studies was that by understanding discriminant factors between successful and failed products, one would understand one's deficiencies, and with such understanding, necessary steps can be taken to avoid or overcome those deficiencies. However, some researchers concentrated on uncovering the key to successful new product development. This can provide guidance for managers in their quest for new products.

A different approach to understanding factors affecting new product development was taken by some researchers by conducting a review of the extant literature on NPD. Perhaps one of the most recent and comprehensive review on NPD is 'Where To Now In New Product Development Research?' (Craig and Hart 1992) wherein Craig and Hart raised a number of issues pertaining to NPD research. One thing, which is apparent, is the lack of agreement among researchers as to the best approach to study NPD. Researchers differ in the scope of their investigations. Some researchers took the generalist approach in which a number of factors were investigated in relation to NPD outcome. Some adopted the specialist approach where they focused their investigations on the impact of one or a few specific variables on NPD outcome.

Researchers also differ in the methodology used, which can either be quantitative or qualitative in approach, or on the population being investigated, or on the analytic procedure employed. The level at which NPD is investigated also differs and can either be at project or program level, and whether success or failure or both are measured. Researchers also differ in terms of how success was measured. The types

of NPD investigated ranges from NPD that incorporated highly new technology resulting in a completely new product to those that incorporate very little new technology resulting in a modified product.

Despite these differences, the findings from past studies on NPD have tended to be similar (Lilien and Yoon 1989; Barclay 1992; Craig and Hart 1992); these findings indicate that the factors influencing the outcomes of NPD has remain unchanged throughout the four decade these research were carried out.

SUCCESS MEASURES

Not only was it difficult to define a new product, it was even more difficult to define success or failure in NPD because of the different notion of success and failure attaches to NPD. However, financial measures are more widely used by researchers as compared to non-financial measures. The most common financial measures used were those that are profit-based and sales-based.

KEY SUCCESS FACTORS

The reviews of the literature by various researchers in the area have resulted in a myriad of key success variables that interact in a complex way. In order to reduce the complexity, Craig and Hart (1992) suggested a framework to collapse all the factors into key themes that can describe the similarities and differences between the various factors. These themes categorically segment the factors into 6 parsimonious groups, which helps to put these factors into a proper perspective for the purpose of this research. These themes are:

- management - relates to top management involvement, support, communication and commitment to NDP
- process - relates to development activities in order to generate new products
- people - relates to inter-functional co-ordination, communication, product champion
- strategy - relates to product planning and objectives
- information - relates to marketing information and other general information
- company characteristics - relates to organisational structure and resources.
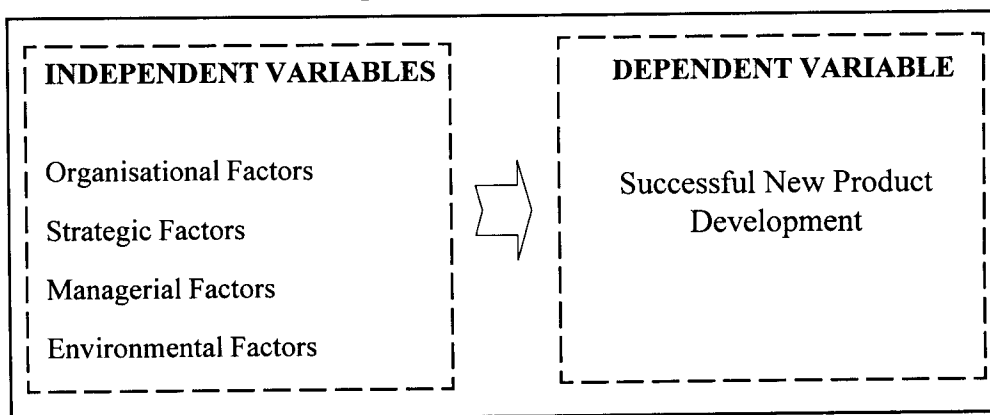
RESEARCH MODEL

Based on the review of the literature for this study, it is found that NPD success is associated with a number of factors that are internal as well as external to the company, such as managerial, organisational, strategic, marketing, product characteristics, NPD process, external environment and information/communication.

Subsequently, a research model, outlined in Figure 1, was developed for this study. This model took into account a number of factors including those that are internal as well as external to the firm. These factors formed the independent variables while success in NPD formed the dependent variable.

DATA COLLECTION

A questionnaire was used to collect the data. In formulating this questionnaire, a number of previous studies were consulted (Cooper 1979; Calantone and diBenedetto 1988; Calantone et. al. 1993; Rothwell 1972; Kheir-El-Din 1990; Baker and Hart 1989; Khanwalla 1977). The resultant questionnaire incorporated questions from these studies since most of the questions have been tested to have high reliability scores of over 0.70. Interviews were conducted as well. The respondents were selected from the Federation of Malaysian Manufacturers Directory. A total of 614 questionnaires were mailed to a random sample of Malaysian companies. 201 questionnaires were received, representing a 33 percent response rate.

Figure 1 : Research Model

INDEPENDENT VARIABLES	DEPENDENT VARIABLE
Organisational Factors	Successful New Product Development
Strategic Factors	
Managerial Factors	
Environmental Factors	

DATA ANALYSIS

A series of tests and analyses were carried out to determine factors that influence successful NPD. Reliability analysis was performed, to purify the data, before the factor analysis was conducted which reduced large number of variables into fewer parsimonious groups. This means that a reliable measuring instrument will give consistent results even when different people administer it at different times (Norusis 1992).

For this study, reliability analysis was widely employed and was performed on the multi-item scales to assess the reliability of the constructs used. The reliability analysis will determine items that are highly correlated. These are the items that will be retained for further analysis. This computation will determine that all the items making up a construct share a common core (Churchill 1979). There are several different ways of assessing the reliability of a measure. According to Jain et. al. (1982), reliability can be assessed by:

- stability measure, i.e. the degree of correlation between responses at two different points in time,
- equivalence measure, i.e. the degree to which different items in a multi-item scale form to represent a construct or measure the same construct,
- alternative forms, i.e. the degree of correlation between measures obtained through two different forms, which assess the same construct, but are administered at different points in time.

In this study, the second method (multi-scale item measure) is used to assess the reliability of measures of the constructs. For this method, Peter (1979) suggested the use of Cronbach's coefficient alpha which is the most commonly accepted approach for assessing the reliability of a multi-item scale. Similarly, Churchill (1979) emphasised that Cronbach's coefficient alpha should be the first measure a researcher should undertake when assessing the merits of a measuring instrument. Since the Cronbach alpha indicates how much correlation there is between one item and all the other items measuring the same common entity or construct, it is used in this study to determine if all the items in the measuring instrument are correlated to one another and are therefore reliable for use in subsequent analysis.

Cronbach alpha is represented by a correlation coefficient value ranging from 0 to 1. The higher the value of the coefficient alpha, the more reliable is the variable at measuring the event or a construct. This also indicates how strong an internal consistency the construct has.

Item-to-total correlation score is used to determine which items are to be deleted and which are to be retained for further analysis. This score is used to measure the relationship of one item with the rest of the items in the scale. A cut-off point of 0.3500 was used, as recommended by Edgett (1991). In other words, items that have an item-to-total correlation score of 0.3500 and above will be retained and those that obtained a score of lower than 0.3500 will be deleted from further analysis.

RESULTS OF THE RELIABILITY ANALYSIS

Reliability tests were carried out on all items making up the ten groups of determinant hypothesised as being associated with successful NPD. The results in Table 1 shows that among the 85 items, 75 obtained item-to-total correlation scores of 0.3500 and above, and were retained for subsequent factor analysis. The remaining 10 items obtained scores of lower than 0.3500 and were omitted from further computation. (The items that were in bold and marked with an asterisk (*) were items that were dropped in order to improve the overall reliability.). The 10 items that were dropped were ENVIRON1, ENVIRON2, ENVIRON3, ENVIRON4, STRUCTU5, NPDPLAN1, NPDPLAN2, NPDPLAN3, NPDPLAN5 and NPDPLAN6 for having poor correlation. After dropping these items the reliability analysis was again carried out on the remaining items until all the items have correlation scores of 0.3500 or more.

FACTOR ANALYSIS

After assessing the quality and reliability of the variables, factor analysis is carried out. According to Kim and Mueller (1978), factor analysis is one of the most widely used quantitative techniques in social science research as this procedure allows large number of variables to be collapsed into smaller and more manageable groups of parsimonious factors. These dimensions, or factors, can be used to represent a certain construct or phenomenon.

Table 1: Reliability Analysis for Determinants of NPD Success

NATURE	(Nature of New Product Project)
CHARACT	(Characteristics of New Product)
MKTSKIL	(Marketing Resources and Skills)
ENVIRON	(External Environments)
PRODUCT	(Production Resources and Skills)
MKTPHIL	(Marketing Philosophy)
PROCES	(New Product Development Process)
DECISN	(Managerial Decisions and Policies)
STRUCTU	(Organisational Structure)
NPDPLAN	(NPD Strategic Orientation and Planning)

Factors Retained and Deleted

VARIABLE	CORRECTED ITEM-TOTAL	VARIABLE	CORRECTED ITEM-TOTAL
NATURE1	.6720	CHARACT1	.6914
NATURE2	.6179	CHARACT2	.7865
NATURE3	.7310	CHARACT3	.7776
NATURE4	.5790	CHARACT4	.8174
NATURE5	.5635	CHARACT5	.6901
NATURE6	.6152	CHARACT6	.6022
NATURE7	.5552	CHARACT7	.5825
NATURE8	.5598		
NATURE9	.6253		
NATURE10	.5861	ENVIRON1	**.1384***
NATURE11	.5862	ENVIRON2	**.1481***
		ENVIRON3	**.2359***
		ENVIRON4	**.2253***
MKTSKIL1	.6573	ENVIRON5	.4829
MKTSKIL2	.7444	ENVIRON6	.5177
MKTSKIL3	.7190	ENVIRON7	.6778
MKTSKIL4	.4852	ENVIRON8	.3595
MKTSKIL5	.7090	ENVIRON9	.4948
MKTSKIL6	.7227	ENVIRON10	.5268
MKTSKIL7	.6838	ENVIRON11	.6451
MKTSKIL8	.6529	ENVIRON12	.5238
MKTSKIL9	.6621	ENVIRON13	.5323
PRODUCT1	.6133	MKTPHIL1	.3545
PRODUCT2	.7099	MKTPHIL2	.3629
PRODUCT3	.8211	MKTPHIL3	.4103
PRODUCT4	.8223	MKTPHIL4	.5312
PRODUCT5	.7831	MKTPHIL5	.5236
PRODUCT6	.6049	MKTPHIL6	.5294
PROCESS1	.5379	DECISN1	.5573
PROCESS2	.6166	DECISN2	.3803
PROCESS3	.5950	DECISN3	.5101
PROCESS4	.6869	DECISN4	.7162
PROCESS5	.6845	DECISN5	.7031
PROCESS6	.5341	DECISN6	.7851
PROCESS7	.5360	DECISN7	.8246
PROCESS8	.4773	DECISN8	.7182
PROCESS9	.6127	DECISN9	.7868
PROCESS10	.5917	DECISN10	.7748
STRUCTU1	.3766	NPDPLAN1	**.1591***
STRUCTU2	.5728	NPDPLAN2	**-.1840***
STRUCTU3	.3929	NPDPLAN3	**-.1522***
STRUCTU4	.5350	NPDPLAN4	.4041
STRUCTU5	**.1810***	NPDPLAN5	**.0837***
STRUCTU6	.4740	NPDPLAN6	**.2812***
STRUCTU7	.5091		

Note: Items that are in bold and marked with an asterisk (*) were dropped in order to improve reliability

Generally, there are four steps in the process of factor analysis:
1. A correlation matrix is computed for all variables.
2. Factor extraction i.e. the number of factors necessary to represent the data and the method for calculating them is determined.
3. Rotation is performed to transform the factors in order to make them more interpretable.
4. Scores for each factor can be calculated and used for further analysis

From the factor analysis, 17 factors were extracted. Internal reliability of all 17 factors was measured by calculating the Cronbach's alpha. As a guide, Nunnally (1967) suggested that a reliability score of 0.50 to 0.60 indicate a satisfactory level of reliability. Increasing reliabilities above 0.80 is often a waste of time and money. However, researchers should generally strive for reliabilities of 0.70 and above (Nunnally, 1978).

The result of the reliability test showed that sixteen of the factors obtained high alpha scores of above 0.70. This verified that the construct possesses a more than satisfactory level of reliability standard. Table 2 below presents the factors extracted from the factor analysis and their respective reliability scores.

TEST OF RELATIONSHIPS BETWEEN FACTORS AND SUCCESSFUL NPD

The factors determined were then tested for their relationship with NPD success using Pearson Product Moment Correlation Coefficient. The Pearson Product Moment Correlation Coefficient is an index to help determine if a linear relationship exists between two variables. The value of the Pearson Product Moment Correlation Coefficient can range from -1 to +1. A positive value means that there is a positive relationship and a negative value means a negative relationship while a zero value indicates that there is no linear relationship. Furthermore, Pearson Product Moment Correlation Coefficient is the most widely used statistical technique for investigating the relationship between two variables (Peterson 1982).

The dependent variable used in this study is a firm's NPD performance. NPD performance is measured in terms of a manager's assessment of how well their company performs in respect of new product contribution towards the firm's profitability

Table 2   Reliabilities of the Dependent Variable and Independent Variables

DEPENDENT VARIABLE					
	CONSTRUCT	TOTAL VARIABLES	FACTORS	SELECTED VARIABLES	α value
1	NPD PERFORMANCE MEASURE	3	1. FACPERF	market share profitability sales revenue	0.6650
INDEPENDENT VARIABLES					
	CONSTRUCT	TOTAL VARIABLES	FACTORS	SELECTED VARIABLES	α value
1	NATURE	11	1. FACMDP 2. FACFAM 3. FACTIP	NATURE1,2,3,9 NATURE5,6,10,11 NATURE4,7,8	0.8528 0.7979 0.7698
2	CHARACTERISTICS	7	1. FACSUPER	CHARACT1-7	0.8982
3	MARKETING RESOURCES AND SKILLS	9	1. FACMKNO 2. FACMRESC	MKTSKIL5-9 MKTSKIL1-4	0.8820 0.8116
4	PRODUCTION RESOURCES AND SKILLS	6	1. FACPSKIL	PRODUCTN1-6	0.8971
5	EXTERNAL ENVIRONMENTS	9	1. FACDYSM 2. FACMKTRCP	ENVIRON10,12,13 ENVIRON5-9,11	0.7058 0.8026
	CONSTRUCT	TOTAL VARIABLES	FACTORS	SELECTED VARIABLES	α value
6	PROCESS	10	1. FACPDTEC 2. FACPRLAU 3. FACLAUN	PROCESS1-3,5 PROCESS4,6-8 PROCESS9,10	0.8156 0.7723 0.7313
7	MANAGERIAL DECISION MAKING	7	1. FACSUPT	DECISN4-10	0.9391
8	MARKETING PHILOSOPHY	6	1. FACMKT 2. FACIN	MKTPHIL3-6 MKTPHIL1,2	0.7466 0.6141
9	ORGANISATIONAL STRUCTURE	7	1. FACCREATIV 2. FACSEMRIG	STRUCTU6,7 STRUCTU1-4	0.7908 0.7157
	TOTAL	75	17	75	

CONCLUSION

Success in NPD is attributable to a combination of factors. From the review of the literature, eight groups of variables were identified as having an effect on NPD success. The result of this study shows that, out of the eight groups or dimensions investigated, six were found to be associated with NPD success in the context of Malaysian manufacturers. These six dimensions were:

(financial measure), increase in market share and sales revenue (also known as a customer acceptance measure). To combine the three items together into one dependent variable, factor scores were computed as represented by FACPERF.

Meanwhile the independent variables used for purposes of testing the relationship are derived from the factor analysis as presented in Table 2.

CORRELATION ANALYSIS

Pearson Product Moment Correlation Coefficient was used to test for the relationship between the dependent variable (FACPERF) and the 17 independent variables. It was found that there were strong positive relationship between performance in NPD (FACPERF) with factors such as technologically innovative products (FACTIP), superior and unique products (FACSUPER), marketing skills and resources (FACMSKIL), market knowledge (FACMKNO), production skills and resources (FACPSKIL), production and technical competencies (FACPDTEC), prelaunch activity competencies (FACPRLAUN), semi-rigid structure (FACSEMRIGD), creative and participatory decision making (FACCREATIV), market orientation (FACMKT), inward orientation (FACIN). The result of the Correlation Analysis is presented in Table 3.

- product,
- marketing,
- process,
- strategy,
- organisation, and
- information.

The other two, which were not found to correlate with success, were managerial and environmental factors.

Table 3: Summary Correlation Analysis

Factors		Significance level
FACMDP	There is a positive relationship between market derived product development and NPD success	0.250
FACTIP	There is a positive relationship between technologically innovative product development and NPD success	0.000**
FACFAM	There is a positive relationship between the level of familiarity with the new product project and NPD success	0.423
FACSUPER	There is a positive relationship between products that are superior and unique in attributes relative to competing products and NPD success	0.006**
FACMSKIL	There is a positive relationship between the adequacy of marketing skills and resources and NPD success	0.025*
FACMKNO	There is a positive relationship between the level of marketing knowledge and NPD success	0.006**
FACPDSKIL	There is a positive relationship between the adequacy of production skills and resources and NPD success	0.000**
FACPDTEC	There is a positive relationship between the level of production and technical competencies and NPD success	0.050*
FACPRLAUN	There is a positive relationship between the level of competencies in the product prelaunch activities and NPD success	0.158
FACLAUN	There is a positive relationship between the level of competencies in the product launch activities and NPD success	0.016*
FACSUPT	There is a positive relationship between the level of involvement and support given by top level management for the NPD project and NPD success	0.097
FACCREATIV	There is a positive relationship between the level of participation and integration between different departments in new product decision making and NPD success	0.109
FACSEMRIGD	There is a positive relationship between the level of organisational flexibility and NPD success	0.032*
FACMKT	There is a positive relationship between the level of the company's market orientation and NPD success	0.003**
FACIN	There is a negative relationship between the level of the company's inward orientation and NPD success	0.001**
FACDYSM	There is a negative relationship between the level of market dynamism and NPD success	0.322
FACMKTRCP	There is a positive relationship between receptive market conditions and NPD success	0.103

**   significant at 0.01 significance level
*   significant at 0.05 significance level

One factor that was found to be statistically significant but <u>negatively</u> correlated to NPD success was inward orientation. This implies that a company that focuses on short term financial gains, rather than long term gains, contributes negatively to NPD success. Inward orientation also implies a company that is heavily production oriented, taking advantage, for example, of economies of scale at the expense of market needs. In this case, the study found that such a production-orientated emphasis was counter productive to NPD success.

The findings lend support to the theory that success in NPD is associated significantly with products that are unique and superior in nature. Successful products are also those that are technologically innovative, which come about as a result of a company's technological breakthrough. New production processes are required to produce this new product. This calls for companies to be well equipped with the necessary production and technical resources, skills and competencies.

Success in NPD is also associated with a company's marketing knowledge, resources, skills and competencies. Companies that possessed competent personnel with relevant marketing skills and proficiencies were more able to perform market research and promotional activities. By employing staff with relevant marketing skills and proficiencies, companies can gather market information that is pertinent to NPD, such as customer needs and desires, market potential, buyer behaviour and competitive situation.

Success in NPD is also associated with the adequacy of production resources, knowledge, skills and competencies. NPD projects that are supported by a company's strengths in production, engineering and technical resources stand a greater chance of success. It is, therefore, essential to ensure that the production and technical activities are carried out proficiently. By employing staff with the relevant production skills and competencies, companies will have a comprehensive understanding of product design and production processes and technology.

It is interesting to note that overall this study supports Cooper's (1979) findings to a great extent, hence confirming them within the Malaysian context.

In addition, it was also found that product launch activities, organisational structure and company's strategic focus was also important NPD success determinants. A proficient, well-planned and executed product introduction is important to ensure success. Company should support new product introduction with good promotional and advertising programmes. This will enhance the diffusion of the new product throughout the market. The sales force must be trained and able to promote the product throughout the distribution network. Retailers must be persuaded to carry the new products to add to the array of current products.

This study also found that organisations that provide incentives for innovation, and are structured to allow smooth communications between and across functions as well as possessing a management style which delegates decision making authority to line managers, tend to stand a greater likelihood of success. These findings support earlier studies regarding organisational flexibility and success (Peters and Waterman 1982, Johne 1985).

Company's strategic focus plays a significant role in determining success in NPD. Marketing-oriented companies, characterised by their greater emphasis on satisfying customers needs, are better able to achieve NPD success than inward looking, financially-oriented companies. Market oriented companies tend to manage their businesses by anticipating changes and by being proactive in the marketplace while focusing on the long term aspects of their business. The findings reveal that the less the company focuses on short-term profitability and bottom line productivity, the greater will be the rate of success in NPD.

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