

Measuring New Product Success: The Difference that Time Perspective Makes

Erik Jan Hultink and Henry S. J. Robben

Management is often criticized for overemphasizing short-term profits at the expense of long-term growth. On the other hand, although numerous studies have explored the factors underlying new product success and failure, such studies rarely distinguish between short- and long-term success. In fact, little research has been conducted to explore the relationship between a company's time perspective and its choice of criteria for measuring new product success. For that matter, little consensus exists as to just what we mean by the term success.

Expanding on work done by a PDMA task force on measurement of new product success and failure, Erik Jan Hultink and Henry S.J. Robben identify 16 core measures of new product success. In a survey of large Dutch companies, they explore managers' perceptions of new product success, hypothesizing that the importance attached to each of the 16 core measures depends on the company's time perspective. For example, they propose that criteria such as development cost and speed-to-market are more important in the short term, and return-on-investment (ROI) is more important in the long term.

The study also examines the type of market served, the innovation strategy, and the perceived innovativeness of the company's products. It is hypothesized that these factors will influence the importance the company attaches to the core measures of new product success. For example, it is expected that speed-to-market is probably more important for technological innovators than for fast imitators or cost minimizers.

The findings support the hypothesis that the firm's time perspective influences the perceived importance of the core measures of success. For the short term, the respondents emphasize product-level measures such as speed-to-market and whether the product was launched on time. In the long term, the focus is on customer acceptance and financial performance, including attaining goals for profitability, margins, and ROI. Four factors are perceived as being equally important for short-term and long-term success: customer satisfaction, customer acceptance, meeting quality guidelines, and product performance level. Customer satisfaction was found to be the most important measure, regardless of a company's time perspective.

Contrary to expectations, the perceived importance of the 16 core measures does not differ on the basis of the type of market, the innovation strategy, or the product's perceived innovativeness. In addition, the firm's functional orientation—technology push or market pull—does not affect the importance attached to the core measures of new product success.

Address correspondence to Erik Jan Hultink, Delft University of Technology, Faculty of Industrial Design Engineering, Jaffalaan 9, 2628 BX Delft, The Netherlands.

Introduction

New products are important for a company's success. Companies cannot depend on their current product offerings alone to meet their profit and sales objectives. However important, still many new products do not succeed in the marketplace. For example, Booz, Allen, and Hamilton [4] reported failure rates between 30% and 40%. For these reasons it is not surprising that researchers [e.g., 7,23,29], managers, and consultants alike have shown an increasing interest in the determinants and correlates of new product success and failure.

In investigating the success and failure factors within new product development (NPD), researchers face a dual task: as well as having to study the critical success factors, they must also define *success* [17]. This is neither an easy nor a straightforward task because NPD success is multidimensional. For example, Griffin and Page [15] found that researchers and practitioners used a total of 75 different measures of product development success and failure. Hart [16] found little consensus among the major research studies on how to define success. She noted that much of the literature has skillfully sidestepped the issue of what the essence of new product success is. To date, it is still a question which dimensions of success one should include and how to measure these dimensions. This issue is a major problem because the way in which new product success is defined clearly influences the findings that describe the factors contribut-

ing to new product success [16]. For example, the determinants of new product success will probably be different when success is operationalized as met market share goals than when success is operationalized as return-on-investment (ROI).

Some researchers have started to study these dimensions of success in the last decade [6,8,15-17]. Although some dimensions of new product success could be identified, a gap still exists: time perspective and firm characteristics have not been considered to a full extent. For example, in most empirical studies on new product success and failure, no distinction was made between short-term and long-term new product success. However, some studies [15,16] seem to suggest that a firm's time perspective and other characteristics may matter with regard to the importance firms attach to measuring indicators of new product success. In addition, most studies treated their sample of respondents as coming from the same company, competing in the same industry with the same products and the same innovation strategy. This assumption is unrealistic. The purpose of the present article is to study whether and how the importance attached to NPD success measures depends on the time perspective and on firm characteristics.

This research project partly replicates and simultaneously expands the work done by the Product Development and Management Association Taskforce on the measures of NPD success and failure. Griffin and Page's [15] core measures of new product success are used in the present study to explore the importance of new product success for the short-term and the long-term, as well as to relate the importance attached to these measures to firm characteristics. Before we deal with our research question more explicitly, we will review the literature on new product success measures.

Literature Review

The problem of how to define success is not a new one. A large body of literature exists that deals with the overall competitive performance and the diverse ways in which this construct can be measured [2,3,5,12,19,20,28]. For example, Venkatraman and Ramanujam [28] developed a two-dimensional classification scheme that highlighted 10 different approaches to the measurement of business performance. Their first dimension concerned the use of financial (e.g., profit, sales growth, turnover, and ROI) versus

BIOGRAPHICAL SKETCHES

Erik Jan Hultink is Assistant Professor of Marketing at the Faculty of Industrial Design Engineering, Delft University of Technology, Delft, The Netherlands. He is a member of the Center for Market Driven Innovation (CMI), a research cooperation on new product development among the University of Amsterdam, Delft University of Technology, and Erasmus University Rotterdam, all in The Netherlands. He received his M.Sc. in economics from the University of Amsterdam in The Netherlands. His Ph.D. research concentrates on launch strategies and new product success measures. Other current research interests include high-technology marketing and marketing planning for new products.

Henry S. J. Robben is Associate Professor of Marketing at the Faculty of Industrial Design Engineering, Delft University of Technology, Delft, The Netherlands, and he is a member of CMI. He received a B.A. in psychology and an M.Sc. in economic psychology from Tilburg University and his Ph.D. in psychology from Erasmus University, both in The Netherlands. He has published on business management simulations, marketing effects of scarcity, and on the effectiveness of marketing communications.

broader operational criteria (e.g., innovativeness, market standing, and social responsibility), whereas the second focused on two alternate data sources (primary versus secondary). Dess and Robinson [12] examined the usefulness of subjective performance measures obtained from top management teams when problems are encountered in obtaining accurate performance data. They concluded that researchers might consider using a subjective perceptual measure when accurate objective measures are unavailable, and the alternative is to remove the consideration of performance from the research design. This finding has been replicated by Pearce, Robbins, and Robinson [24].

Because new product performance is one aspect of a company's overall performance, much of what has been written on company performance is also relevant to NPD performance measurement [17]. For example, the distinction between financial and operational criteria [28] is also relevant in a new product success setting. Some authors have dealt with new product success measurement more explicitly. For example, Cooper [6] and Cooper and Kleinschmidt [8] examined how new product success can be measured, if there were independent measures or different ways of looking at success, and what the components of success are when success is viewed in different ways.

Cooper [6] included eight performance measures that capture different facets of a firm's performance, like the percentage of current company sales made up by new products introduced over the last 5 years, the extent to which the new product program met its performance objectives and the overall success of the program. Factor analysis of these eight measures resulted in three independent dimensions of new product success, namely the impact, which describes the impact or importance of the program on company sales and profits; the success rate of the program, which gauged the track record of the products the firm develops; and the relative performance, which captures the overall performance of the program relative to objectives, to competitors, and in terms of profits versus costs.

These findings are important for the following reasons. First, some independent dimensions of new product success were identified. In addition to that, success on one dimension did not necessarily mean success on the other two [6]. Finally, some strategy aspects that lead to a certain type of success may not lead to a different type of success, or even prevent this from occurring. For example, a penetration pricing strategy may lead to a high market share but may be

negatively related to the margin-to-sales ratio, especially in the short-term. Cooper [6] concluded that companies must first take a close look at the type of success they desire and then select the most appropriate strategy.

Cooper and Kleinschmidt [8] elaborated on the previous study. Again it was found that success is not a simple, unidimensional concept. Their research included 10 success measures. They identified three independent dimensions that characterize new product success, namely financial performance (e.g., relative profits to sales, profitability level and pay back period); opportunity window (the degree to which the new product opened up new opportunities to the firm in terms of a new category of products and a new market area for the firm); and market impact (e.g., domestic and foreign market share). The conclusions were consistent with [6]: there seem to be three ways of looking at new product success. This finding implies that there may also exist three sets of success determinants.

Cordero [9] distinguishes measures to evaluate overall performance, measures to evaluate technical performance, and measures to evaluate commercial performance to assess new product success. Measures to evaluate overall performance are, for example, pay-out period, the percentage of new product sales as compared with the industry average, and the sales of new products developed in the last five years as a percentage of current sales. Measures to evaluate technical performance include "business opportunity," which is the monetary value of the total market created by technical inputs, the number of patents, and the number of publications and citations. The most important measure to evaluate commercial performance, according to Cordero, is cash flow. Cordero [9] recognizes that there is no measure that is entirely satisfactory. For this reason, managers should use multiple measures. Which ones to use and when to use them remain two unsolved questions, however.

Hart and Craig [17] attempted to overcome the lack of consistency in defining new product success among the existing literature on NPD research by providing a framework. The framework has four building blocks: the measure of success, the level of analysis, the source of data, and the data-collection method. First, NPD studies have used a variety of different types of success measures: whereas some use financial measures of success (e.g., profit and sales), others use nonfinancial measures (e.g., design, social performance, and technology), and a third group uses a com-

bination of the two. The financial and nonfinancial measures can be applied directly (absolute figures or percentages) or indirectly (opinion scales or yes/no questions). Secondly, studies on NPD success and failure differ in the level at which performance is investigated. Some researchers focus on the new product program level, whereas others look at the individual new product level. Because most companies have introduced at least one successful new product, focusing on the individual new product level may not truly reflect the company's ability to innovate [20]. Focusing on the program level requires data over a longer period of time, however. Imperfect memory conditions may cause respondents to report events inaccurately [13,25], an event that decreases the validity of the findings. Finally, the data have been collected through different data collection methods (e.g., interviews, mail questionnaires) and with different data sources (e.g., self-, expert-, or peer assessment).

Hart and Craig [17] conclude with suggesting the most appropriate combinations of the four building blocks for further research. An example of such a combination is the following: if success is measured at the project level, self-assessment by means of a personal interview is probably most suitable for collecting financial and nonfinancial measures of NPD success. The project level of analysis focuses on a particular project. For this reason, self-assessment by the responsible managers is probably the most suitable data source. Personal interviews allow the researcher to go into more detail about the project than either desk research or the use of questionnaires.

Hart [16] dealt with the relationships between direct and indirect financial measures at the company level and financial and nonfinancial measures at the new product level. The empirical results showed that indirect measures can be fruitfully applied in place of direct measures. This finding, which is consistent with Dess and Robinson [12] and with Pearce, Robbins, and Robinson [24], is especially important from a data access point of view. Respondents usually are more reluctant to provide direct financial data than providing indirect financial data. On the other hand, it was found that few significant associations existed among financial and nonfinancial measures of NPD success. This finding is counterintuitive because researchers and practitioners have at least implicitly assumed a positive relationship between financial and nonfinancial success. Finally, Hart [16] applied principal component analysis to eight statements describing successful outcomes of new product developments. This

procedure resulted in three profiles of new product success, namely one based on using a technological race with competitors, one based on cost reduction and price competitiveness, and one based on ROI, by being first to market.

It is obvious that the use of different success and failure measures in the studies reviewed previously makes it difficult to generalize results across investigations. Griffin and Page [15] attempted to identify all currently used measures of NPD success and failure, and to organize them into categories that perform roughly the same function. For this purpose they drew together and compared the measures by which academics and companies evaluate new product success. Scrutinizing 77 articles (out of 61 different research projects) resulted in 46 different success and failure measures. Two additional surveys yielded 34 different success/failure measures in use, and respondents indicated that they would like to use 45 different measures. Thus, 75 different measures were collected. Expert grouping by a group consensus process and factor analysis both resulted in five general independent categories of success and failure measures, namely:

- measures of firm benefits;
- program-level measures;
- product-level measures;
- measures of financial performance; and
- measures of customer acceptance.

Neither practitioners nor academics use just a single measure of new product success. In addition, academics measure different aspects of NPD success than practitioners do. Corporate respondents were more interested in individual new product success, whereas academics have focused on the overall success of NPD programs and their impact at the firm level. A comparison of the measures academics use with the measures practitioners use or would like to use resulted in 16 core measures, i.e., measures everyone uses or wants to use. We have adopted these core measures as the focus of the present study. These 16 core measures are listed in the first column of Table 1. Griffin and Page [15] concluded that both academics and practitioners indicate that measuring NPD success requires a multi-dimensional conceptualization. They also mentioned that at this point there is only partial consensus on the most useful combination(s) of success/failure dimensions.

Table 1. Importance of Success Indicators for Short-Term and Long-Term Perspectives: Test of Hypothesis 1

Measure	Short-Term	Long-Term	t-value
Customer satisfaction	1.5	1.4	1.9
Customer acceptance	1.5	1.5	0.6
Met quality guidelines	1.5	1.5	0.2
Product performance level	1.8	1.9	0.7
Launched on time	1.8	3.1	6.7 ^b
Speed to market	2.1	2.7	4.3 ^b
Met revenue goals	2.3	1.8	3.0 ^a
Met unit sales goals	2.4	1.9	3.1 ^a
Revenue growth	2.5	2.3	0.9
Attain margin goals	2.7	1.6	6.9 ^b
Attain profitability goals	2.7	1.4	7.5 ^b
IRR/ROI	2.7	1.8	6.9 ^b
Development cost	2.7	3.1	2.7 ^a
Breakeven time	2.7	2.5	1.4
Met market share goals	2.7	1.8	7.7 ^b
% of sales by new products	3.5	2.7	5.8 ^b

Entries are means from a scale with a "1" indicating that the measure is very important, and a "5" indicating that a measure is not important; true *N* per *t*-test varies because of missing values, ^a*p* < 0.01, ^b*p* < 0.001; significance values are two-tailed.

As described earlier, some researchers have attempted to arrive at a set of NPD success measures that can unequivocally be used in future research on and in practice of NPD. Several dimensions of success have been suggested by Cooper [6], Cooper and Kleinschmidt [8], Griffin and Page [15], and Hart [16]. All these studies have in common, however, that they have surpassed the time perspective and firm characteristics, although some implicitly or explicitly hint at the importance of time perspective and firm characteristics in this respect [15,16]. Therefore, our research concentrates on the question of how the importances attached to the core measures identified by Griffin and Page [15] relate to the time perspective and to firm characteristics.

Research Questions

In this section we will deal with the influence of the time perspective on the perceived importances of the core NPD success measures. Subsequently, the influence of firm characteristics on the perceived importance of those measures will be discussed.

NPD Success Measures and Time Perspective

Hayes and Abernathy [18] criticize the focus of attention of many American managers on short-term finan-

cial measures instead of on long-term growth. Also, Aaker [1] recommends developing performance indicators that will reflect long-term performance. Finally, Hart and Craig [17] mention that it is better to include measures that can indicate how the company will perform in the future, and not just in the present. This criticism does not necessarily mean that all short-term measures are useless. Ideally, both long-term and short-term performance measures should be considered, but some measures are probably more important in the short-term, whereas others are more appropriate in the long-term. It can be hypothesized that ROI will be considered more important in the long-term than in the short-term because it usually takes some years to recover the development and market introduction costs. For example, the sample of firms in a study by Biggadike [3] achieved a median ROI of -78% after 2 years. This negative number was mainly due to high initial R&D and marketing expenses. Time helped, however; new entrant financial performance improved with time mainly as a result of decreasing R&D expenses.

On the other hand we may argue that speed-to-market and development costs are more important in the short-term than in the long-term. One reason for this may be that marketing costs (e.g., promotion and distribution) become more important when the new product is firmly entrenched in the product life cycle [27] instead of product development costs that are incurred much earlier. Yoon and Lilien [29] provide an empirical example of this. They distinguished short-term and long-term new product performance. Short-term success was assessed by measuring first-year sales, market share, and profit. Long-term success measures included ROI and whether or not the new product grew into a product group.

The line of reasoning given previously leads to the following hypothesis:

Hypothesis 1: The importance attached to each of the 16 core measures of NPD success depends on the time perspective taken.

NPD Success Measures and Background Variables

It seems reasonable to suggest that the importance managers attach to the different measures of NPD success depends on firm characteristics. For example, Griffin and Page [15] examined the use of NPD success measures in relation to the general functional orientation of the firm (i.e., marketing-driven, technol-

ogy-driven, mixture) and with the job function of the respondent (marketing versus R&D/development). They found that the way success/failure is measured did not vary with differences in job function or whether the firm was technology- or marketing-driven. However, some of the reasons for not measuring success/failure depended on these variables. Hart [16] suggests that the nature of objectives set should determine the way in which performance is measured. For example, if the objective is "to reduce competition in the market by the introduction of a low-cost product," ROI is probably not the most appropriate success measure.

To investigate how firm characteristics influence the importance of the success measures in the short-term as well as in the long-term, we included the type of market served, the innovation strategy, the perceived innovativeness of the firm's new products, and the general functional orientation of the firm.

Type of Market Served. It may be hypothesized that some measures are more important in a consumer market and others in an industrial market. Industrial products tend to be technologically complex and often require large investments. Given that industrial customers usually have more expertise, buy more rationally, and use the products in further manufacturing processes, it is possible that the new product success measure product performance level is considered more important in industrial than in consumer markets. Day and Herbig [10] describe how the diffusion of industrial innovations differs from new retail products. This difference in diffusion rates may influence the importance managers attach to the core measures of NPD success and failure. We expect this influence to be present in each time perspective. This reasoning lead us to hypothesize:

Hypothesis 2: The importance attached to the core measures of NPD success, in the short-term as well as in the long-term, depends on which market one serves.

Innovation Strategy. Not all companies use the same innovation strategy. Some companies choose to be a technological innovator, whereas others prefer to be a fast imitator or a cost minimizer [22]. A technological innovator is usually defined as the first company to launch a new product and often is the first to develop a new technology necessary for the product's performance. A fast imitator is a quick follower in a growing and changing market. A cost minimizer usually enters when the speed-of-market changes slows

down. Although one innovation strategy is not necessarily more successful than the other, it seems reasonable to assume that companies with different innovation strategies also use different measures of NPD success because their objectives are different. Technological innovators need to develop a market. They often enjoy first-mover advantages [26]. For these reasons it is possible that the NPD success measure speed-to-market may be more important for technological innovators than for fast imitators and cost minimizers. In a similar vein, cost minimizers usually compete on cost and price. Accordingly, the NPD measure development costs may be more important for cost minimizers than for technological innovators and fast imitators. Finally, fast imitators often try to leapfrog the technological innovators with a higher quality product (e.g., fewer bugs). The NPD success measures *product performance level* and *to meet quality guidelines* can therefore be expected to be most important for fast imitators. We expect these differences in the short-term as well as in the long-term. This leads to the following hypothesis:

Hypothesis 3: The importance attached to the core measures of NPD success, in the short-term as well as in the long-term, depends on the innovation strategy of the firm.

The New Product's Perceived Innovativeness. Not all new products are the same [21]. Whereas some new products are perceived by customers to be slight improvements over competitive products, other products are new to the world. Kleinschmidt and Cooper's [21] results suggest that low and highly innovative new products tend to be more successful than moderately innovative new products. In the present study, we distinguished new products without new usage possibilities, new products with new usage possibilities, and new-to-the-world products, which are products customers have never seen before. We expect that managers measure the success of slight improvements in a different way than the success of new-to-the-world products. New-to-the-world products are often high-learning products, and barriers to adoption for these products are typically high. The introduction stage for these products is accordingly longer than for reformulated new products. It can therefore be hypothesized that, for example, measuring revenue growth and unit sales goals is more important for new products with slight improvements than for new-to-the-world products. More formally stated, we hypothesize:

Hypothesis 4: The importance attached to the core measures of NPD success, in the short-term as well as in the long-term, depends on the perceived innovativeness of the new product.

The General Functional Orientation of the Firm. Griffin and Page [15] asked respondents to describe their company's NPD activity in terms of being marketing-driven, technology-driven, or requiring a balanced input between the two. Cross-tabulating these categories with the NPD success and failure measures used did not result in statistically significant differences. However, Griffin and Page's sample may be somewhat biased in that it consisted of firms who were likely to measure success/failure because they attended a PDMA conference on this topic, and further consisted of American managers. We will test their findings with a more homogeneous sample of Dutch managers, for the short-term as well as for the long-term. Hence, the following hypothesis is developed for the influence of the general functional orientation of the firm:

Hypothesis 5: The importance attached to the core measures of NPD success, for the short-term as well as for the long-term, does *not* depend on the general functional orientation of the firm.

Method

Respondents

The targeted sample consisted of 197 large Dutch companies; annual turnovers varied from \$100,000,000 to over \$1,000,000,000. A questionnaire was sent to an individual in the company after having identified by phone who would be most suitable to complete the questionnaire. Identification of respondents occurred after explaining the purpose of the investigation to the company's switchboard personnel, who then made suggestions. A minority of the addressees contacted the researchers to inform them of having passed the questionnaire on to a colleague whom they thought to be more knowledgeable on the subject matter. This procedure and an additional contact by telephone led to 92 usable questionnaires, a response rate of 47%. Twenty-two companies or 11% indicated that they were not willing or able to complete the questionnaire, mainly because of reasons of secrecy. Table 2 contains the profile of the sample; the number of respondents does not always sum up to 92 due to missing values.

Table 2. Sample Composition

	Number of Responses	Percentage of Sample
Function respondent		
Marketing	68	74
General management	11	12
R&D/Development	10	11
Finance	1	1
Main customer market		
Business-to-business	56	61
Consumer market	35	38
Measures new product success		
Yes	80	87
No	9	10
Do not know	3	3
Product Category		
Miscellaneous	35	38
Services	17	19
Durable consumer goods	14	15
Foods and beverages	12	13
Chemicals	9	10
Agriculture	1	1
Customer perception		
New usage possibilities	38	41
Small improvements	28	30
New to the world	19	21
Development driver		
Mixture	51	55
Market driven	31	34
Technology driven	10	11
Innovation strategy		
Technological innovator	44	48
Fast imitator	39	42
Cost reducer	7	8
Percentage of sales generated by products introduced in the last 5 years		41
Percentage of profits generated by products introduced in the last 5 years		39

Note: Percentages may not sum up to 100% due to rounding errors or missing values.

The Questionnaire

The questionnaire centered around the 16 core measures of new product success identified by Griffin and Page [15]. To facilitate comparison between the present study and other investigations, we adopted the terminology used by Griffin and Page [15] to describe the success indicators. For each of the 16 measures identified in Table 1, the respondents indicated on a 5-point scale how important they judged these measures to be in measuring new-product success or fail-

ure, with a “1” indicating that the measure was very important, and a “5” that it was not important at all. They did so for the short-term, which was defined as the time period representing 25% of the product’s expected lifetime, and for the long-term, defined as 75% of the product’s expected lifetime. For instance, the short-term period that should be considered for a product with an estimated life expectancy of 12 years should thus be 3 years; the corresponding time period for the long-term estimates would then be 9 years.

Follow-up. At the end of the questionnaire, 75% (69) of the respondents indicated they wanted to be informed on the results of the investigation, and 80% (74) would not mind being contacted again. These findings suggest that the respondents in general had a positive attitude toward the investigation.

Results and Discussion

The Importance of Measuring Success Indicators in a Short-Term or Long-Term Perspective

Table 1 contains the means of the ratings for each of the 16 success indicators for both the short-term and the long-term. To assess whether any of these differences were statistically significant, the data were subjected to *t*-tests for dependent samples. Only the responses of managers who indicated that their firms measured success (*N* = 80) were included. For 10 indicators significant differences emerged, indicating that the importance attached to these indicators differed for different time perspectives. This result supports our first hypothesis, which stated that the importance attached to the core measures of NPD success depends on the time perspective taken.

The following measures were perceived as more important in measuring short-term new product success than for measuring long-term new product success; we present mean ratings in descending order and the Griffin and Page dimension where the measures come from:

- 1.8 launched on time
 - 2.1 speed-to-market
 - 2.7 development cost
- } product-level measures

For measuring long-term new product success, the following measures were judged more important than for short-term new product success:

- 1.4 attain profitability goals
 - 1.6 attain margin goals
 - 1.8 IRR/ROI
- } financial performance
- 1.8 met revenue goals
 - 1.8 met market share goals
 - 1.9 met unit sales goals
 - 2.7 % of sales by new products
- } customer acceptance measures

In terms of Page and Griffin’s [15] categorization of the success and failure indicators, for the short-term the measures are associated with product level measures. In the long-term, the focus of measurement is on customer acceptance and financial performance. These results are consistent with current marketing ideas on short-term and long-term company goals [11].

The Perceived Importance of the Success Measures

To judge the perceived importance ratings, only means of 2.0 or less were considered, indicating that the measure was thought to be important or very important on average on the 5-point scales used. Five measures reached this cut-off point for the short-term perspective, and 10 for the long-term perspective. This finding highlights another effect of time perspective: more indicators are considered important for measuring long-term new product success than for short-term new product success. Perhaps this result indicates the difficulty of collecting or evaluating relevant information to assess a product’s short-term market performance.

Inspection of Table 1 indicates that six measures were perceived equally important for the short-term and the long-term measurement of new product success. Apart from the revenue growth and breakeven time measures, these measures reached the average cut-off point of 2.0 on the 5-point scales. Independent from the company’s time frame, four measures are deemed important enough to be measured. These measures are (the figures represent the average means for both the short- and long-term):

- 1.5 customer satisfaction
 - 1.5 customer acceptance
- } customer acceptance measures
- 1.5 whether quality guidelines were met
 - 1.9 product performance level
- } product-level measures

This finding suggests that there are four core measures perceived to be important for both the long- and short-term perspectives. A major conclusion in this respect is that for both the long- and short-terms, customer satisfaction was most important to measure. This finding reflects the recent and ongoing interest in measuring customer satisfaction in the academic and practitioners' literatures.

For the short-term perspective, a unique measure in addition to the four "basic" measures has been identified, namely launched on time (1.8). This finding echoes the emphasis on shortening product development cycle times [see, for instance, 14]. The managers in the sample identified an additional six measures for assessing new product success in the long-term. These were:

- 1.4 attaining profitability goals
 - 1.6 attaining margin goals
 - 1.8 IRR/ROI
- } financial performance measures
- 1.8 meeting revenue goals
 - 1.8 meeting market share goals
 - 1.9 meeting unit sales goals
- } customer acceptance measures

These measures emphasize a long-term rather than a short-term perspective and are therefore consistent with a long-term outlook on new product success. Table 3 categorizes the success measures according to their general or unique contribution.

Summarizing, hypothesis 1 was supported. It appears that when measuring new product success in the short- and the long-term, four basic indicators are considered, with at least one additional unique indicator for each time perspective. The managers thus clearly differentiated between the importance of measuring new product success on the short-term and the long-term.

The four basic measures of new product success

virtually depict the product in interaction with the user. It is here that the heart of new product success lies. If you achieve customer acceptance and customer satisfaction, probably through delivering a product that meets or exceeds the company's quality guidelines and that performs well for the customer, there is a basis for short-term and long-term success. These customer and product performance data can be derived early from market and product tests.

The finding that different measures are relevant for judging short-term and long-term new product success may reflect a need for different information bases, or simply that more information is available at a later time. At product launch, managers would know whether the introduction was on schedule. However, they would not have any data on market share or profitability goals because there is nothing to measure yet. During the introduction and growth phases of the product, information about those indicators becomes available.

The results displayed in Tables 1 and 3 may provide managers with some guidelines on how to proceed with regard to measuring new product success. First, irrespective of the time frame considered, the four indicators identified previously should be measured. Second, depending on the relevant time perspective, a single indicator (short-term) or six indicators (long-term) need to be added.

The Influence of Background Characteristics

Hypotheses 2 through 5 summarized our expectations about the possible associations of background characteristics with the importance that the respondents attached to measuring the success indicators for both the short- and the long-term. To test these hypotheses, we contrasted the importance ratings within each background variable. We considered only those differences that were significant at $p \leq 0.05$, and for which both means were 2.0 or less, indicating that on average the

Table 3. Success Measures and Time Perspective

Measures Important Regardless of Time Perspective	Measures Uniquely Important for	
	the Short-Term Perspective	the Long-Term Perspective
Met quality guidelines	Launched on time	Met revenue goals
Customer acceptance		Met unit sales goals
Customer satisfaction		Met market share goals
Product performance level		Attain profitability goals
		IRR/ROI
		Attain margin goals

indicator is rated important or very important on the 5-point scales used.

Impact of Market Served. Hypothesis 2 stated that the importance attached to the core measures of NPD success, in the short-term as well as in the long-term, would depend on which market one serves. To test this hypothesis, we checked through *t*-tests if firms mainly serving a consumer market differed in the importance they attached to measuring each indicator as opposed to firms mainly serving an industrial market, for both the long-term and the short-term. The significant findings of this test are depicted in Figure 1.

For the short-term, a difference in the rated importances was found for measuring breakeven time, with those serving consumer markets expressing more importance in measuring that indicator than those serving industrial markets ($p < 0.05$). Given that new consumer products are usually sold in larger numbers than new industrial products, this finding is not surprising. Also, firms serving consumer markets considered it more important to meet revenue goals than firms serving industrial markets ($p < 0.10$). However, the means for both differences involved were larger than 2.0, indicating that these indicators attracted only moderate importance ratings. One exception emerged: for firms serving industrial markets, the speed-to-market indicator became important to measure, in contrast to firms in the consumer market ($p < 0.10$). We do not have any acceptable explanation for this finding.

For the long-term perspective, firms serving consumer markets on average found it significantly more important to measure whether margin goals had been met than those serving industrial markets ($p < 0.05$). Firms serving industrial markets considered it more important to measure the speed-to-market than firms

serving consumer markets ($p < 0.10$), although both means involved were larger than 2.0.

It seems fair to conclude that the results in Figure 1 support the conclusion that in general there are no differences between the average importance ratings of measuring each of the 16 new product success indicators between firms mainly serving a consumer market and those mainly serving an industrial market. Focusing on the four basic indicators, it appeared that the means for firms serving consumer markets and industrial markets were almost identical. Hence, the data do not support Hypothesis 2.

Impact of Innovation Strategy. A similar analysis was conducted to test Hypothesis 3, which stated that the importance attached to the core measures of NPD success, in the short-term as well as in the long-term, depends on the innovation strategy of the firm. The number of cost minimizers in our sample was too small to be included in this analysis. For this reason, we checked through *t*-tests if firms that described themselves as technological innovators differed in the importance they attached to measuring each indicator as opposed to firms that described themselves as fast imitators for both the long-term and the short-term. The significant differences are depicted in Figure 2.

Two statistically significant differences at $p < 0.05$ emerged; in both cases the technological innovators found it more important in the short-term to measure "met unit sales goals" ($p < 0.01$) and "development cost" ($p < 0.05$) than fast imitators. It is not surprising that the technological innovators consider "meeting unit sales goals" more important, because it is often their objective to install a critical mass of new products in the market before competitors arrive. In this way they can choose the most favorable market position, experience learning curve effects, and enjoy

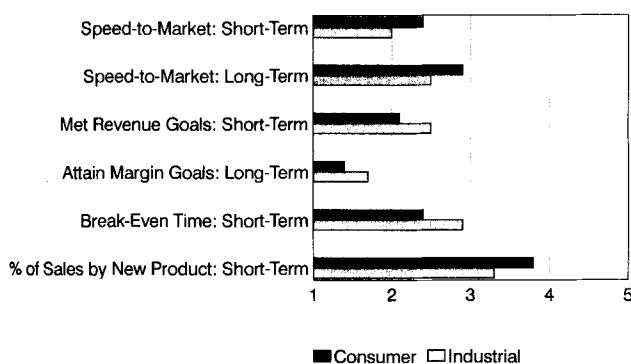


Figure 1. The impact of market served. 1 = Very important; 5 = unimportant.

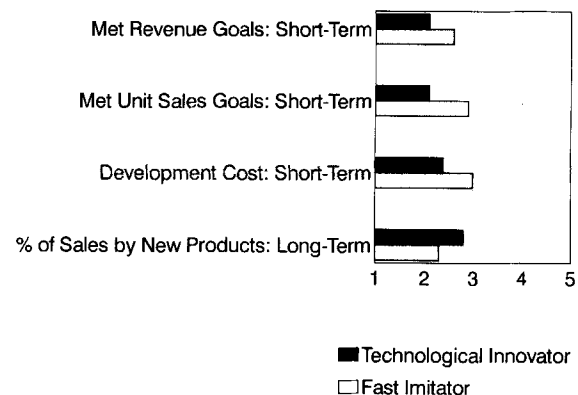


Figure 2. The impact of innovation strategy. 1 = Very important; 5 = unimportant.

economies of scale. Also, higher switching costs may be created for customers. Pioneering is often more expensive than being a fast imitator. This may explain why technological innovators consider it more important to stay within the development budget in the short-term. Also, technological innovators found it more important in the short-term to measure “met revenue goals” than the fast imitators. In the long-run, fast imitators found it more important to measure “% of sales by new products.” The latter two differences approached statistical significance ($p < 0.10$). For all these significant or near significant differences, however, the means involved were higher than 2.0, indicating that on average these indicators were not considered important although some came close.

Again, it seems fair to conclude that the results in Figure 2 support the conclusion that in general there are no differences between the average importance ratings of measuring each of the 16 new product success indicators between technologically innovative firms and those that are fast imitators. Hence, the data do not support Hypothesis 3.

Impact of the New Product’s Perceived Innovativeness. To test Hypothesis 4, which stated that the importance attached to the core measures of NPD success, in the short-term as well as in the long-term, depends on the perceived innovativeness of the new product, we conducted a one-way analysis of variance with the product’s perceived innovativeness (small improvements, new usage possibilities, new to the world) as the independent variable. The significant differences are presented in Figure 3. The F -test was significant in only two cases, indicating an effect for measuring the “met unit sales goals” indicator in the short-term ($F = 5.13$, $df = 1$, 65; $p < 0.01$) and for measuring “customer acceptance” in the long-term ($F = 3.12$, $df = 1$, 63; $p < 0.05$).

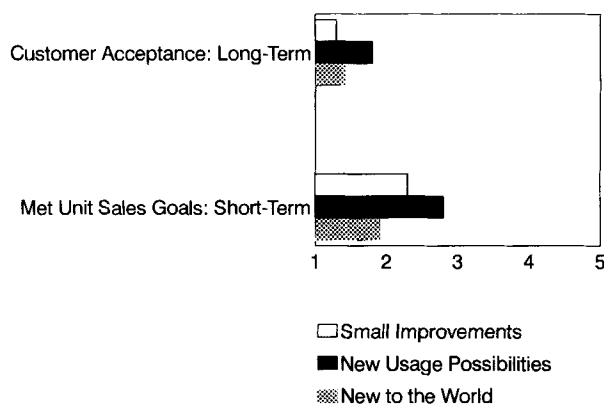


Figure 3. The impact of the new product’s perceived innovativeness. 1 = Very important; 5 = unimportant.

Employing the Scheffé procedure to assess differences between the means led to the identification of a single pair of means that was statistically different at $p \leq 0.05$; It was more important in the short-term to measure “met unit sales goals” for products that were new to the world than for products with new usage possibilities. This difference is relevant because for new-to-the-world products it became important to measure this indicator (mean rating of 1.9), whereas on average it was not important to measure this indicator for the other product types (means > 2.0). For the other statistically significant difference all means involved were 1.8 or lower, indicating that the “customer acceptance” indicator was considered important to very important to measure for all types of product concerned. No pair of means was statistically different.

The test results depicted in Figure 3 generally do not support Hypothesis 4. This finding is taken to mean that there are no differences among the average importance ratings of the 16 core indicators of NPD success for new-to-the-world products, products with small improvements, and products with new usage possibilities.

Impact of the General Functional Orientation of the Firm. Hypothesis 5 stated that the importance attached to the core measures of NPD success, for the short-term as well as for the long-term, would not depend on the general functional orientation of the firm. To test this hypothesis, t -tests were conducted to evaluate the differences in mean importance ratings for the 16 core NPD success measures between firms with a mainly marketing-driven general functional orientation and those whose general functional orientation can be characterized by a mix of market pull and technology push. The number of firms with a mainly technology-driven product development process was considered too small to warrant an otherwise appropriate one-way analysis of variance to test the differences among the means of the three categories. Figure 4 contains the significant differences from these t -tests.

One significant difference at $p < 0.05$ emerged for the short-term time perspective: firms using a mix of market and technology drives found it more important to measure the “met unit sales goals” indicator than marketing-driven firms. The size of the means showed that this indicator was of moderate importance to measure. The difference in the importance of measuring “met quality guidelines” came close to significance ($p < 0.10$), with the size of the means indicating that

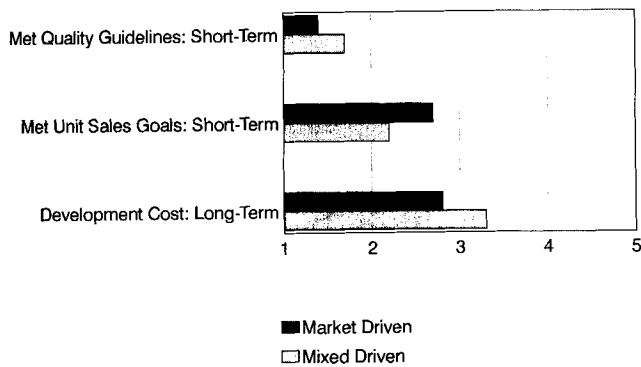


Figure 4. The impact of the general functional orientation of the firm. 1 = Very important; 5 = unimportant.

these indicators were considered important to be measured in the short-term. Marketing-driven firms tended to perceive measuring "meeting quality guidelines" as more important than firms with a mixed general functional orientation. An explanation for this finding may be that firms with a higher marketing orientation consider meeting quality guidelines more important. For the long-term time perspective, one difference came close to significance ($p < 0.10$), with the means indicating that it was moderately important to measure "development costs." Firms that were marketing driven found this measure more important than those who showed a mixed general functional orientation.

The results contained in Figure 4 suggest that, on average, there are no differences in importance ratings of the core NPD success indicators between firms with a mainly marketing-driven general functional orientation and those driven by a mix of market and technology forces. This finding supports Hypothesis 5.

Summarizing, the results do not support Hypotheses 2 through 4. In contrast to expectations, the importance attached to measuring the 16 indicators of new product success does not differ given a long-term or a short-term time perspective for type of market served, the firm's innovation strategy, and for a product's perceived innovativeness. Although some differences were statistically significant and others came close to significance, there was no clear and identifiable pattern within these differences. Apparently, firms operating on different markets with different products and different innovation strategies do not differ in the importances they attached to the measures of new product success, neither in the short-term, nor in the long-term. The results do support Hypothesis 5, stating that the importance attached to the core measures of new product success does not depend on the general functional orientation of the firm.

These findings suggest that the influence of the background variables on the importance that managers attach to measuring the 16 new product success indicators is marginal. Analyzing these background characteristics did not yield any systematic evidence in the sense that there is no consistent set of statistically and conceptually significant differences. This finding corresponds with Griffin and Page [15].

Implications

Obviously, the present study has a number of shortcomings that can be remedied in future investigations. For instance, a small sample was used, mainly consisting of marketing managers. Further, the study elaborated on the core measures provided by Griffin and Page [15] rather than putting their classification to a rigorous empirical test. This set of 16 indicators may not capture all variance in the importance data. Notwithstanding these drawbacks, the study highlights the importance that managers attach to measuring the 16 indicators of new product success.

In general, the present study has shown that managers' perceptions of how important it is to measure indicators of new product success are influenced by the time perspective taken. Here, time perspective was operationalized as the product's expected lifetime. Although the present study has not considered managers' (or their firms') *actual use* of the indicators reported but focused on *perceptions* instead, those perceptions are important. People base their behavior upon what they perceive to be important in their environment. As such, perceptions guide behavior in influencing choices and evaluations. In the present circumstances, this behavior relates to accumulating and distributing information regarding a product's performance.

It is clear that time perspective influences the importance attached to using indicators of new product success, but it is unclear why this happens and what the effects are. The reported analyses showed that this influence could not be attributed to differences in company characteristics.

Research Implications

The main finding of the investigation is that there are clear and interpretable differences with regard to time perspective. Ten out of the 16 measures reported are sensitive to the timeframe presented. This finding indicates that in future studies on the determinants and

correlates of new product success, timeframe has to be specified. If timeframe is not specified, then the results obtained may be of limited value as the importance of most measures varies with a varying timeframe. A small number of measures appears to be important regardless of the timeframe adopted: customer acceptance and satisfaction, product performance level, and meeting quality guidelines. The reason for this importance lies not so much in that these measures do not discriminate between short- and long-term perspectives. Rather, their role resides in putting forward what the general measures of new product success should include whatever time frame one is adopting in measuring new product success. For the short-term, this set of basic indicators is supplemented with one indicator; for the long-term, there are six additional indicators.

There are alternatives with regard to the current use of time perspective, which was defined as representing 25% or 75% of the product's expected lifetime. For different product categories or for different customer groups, these definitions may be or may not be totally realistic. For the present purposes, however, it was necessary to include an identical timeframe for all respondents. A different way to manipulate timeframe would be to have people rate the 16-item instrument for a specified product or product category with known short-term and long-term statistics.

The analyses suggest that background characteristics like type of market served, product innovativeness, innovation strategy, and the general functional orientation of the firm do not influence the importance attached to measuring long-term and short-term new product success. Ideally, this finding should be taken to indicate that heterogeneity of samples concerning these variables need not bias the results. Type of product (e.g., fast moving consumer goods versus durable products) has not been systematically investigated here, and probably warrants further scrutiny in future research. Although the present study did not include all possibly relevant firm characteristics, those mentioned explicitly in the research literature were investigated. Other firm, product or personal characteristics may or may not influence the importance attached to measuring new product success indicators.

An additional line of research may involve the link between the goals of product introductions and actual performance results. Product introduction goals vary according to their nature and time perspective. For example, the performance of a product introduced to create a market barrier is likely to be measured from a

short-term perspective rather than from a long-term perspective. In contrast, a product introduced with the goal of establishing profits is more likely to be evaluated from a long-term perspective. Because introduction goals and new product success are both multidimensional variables, there is a need for multiple indicators to assess both. This conclusion implies that to arrive at a sensible evaluation of new product success, it is necessary to specify and assess both concepts as clearly as possible. Finally, the present research indicated the most important and appropriate dependent variables of the ones used in the study that may be included in studies investigating the impact of, for example, strategy and organization decisions on NPD success.

Managerial Implications

For managers, the findings of this study may be practical when a marketing audit for new products is conducted. In this respect, one of the most profound findings of the study was that it is not important what type of market the firm serves, what kind of innovation strategy is followed, what the general functional orientation of the firm is, and what types of new product the firm develops: *all firms should probably use the same new product success measures*. Taking the time perspective into account is important. It facilitates the choice of the most appropriate evaluation measure. In essence, such a procedure would drive the collection and distribution of relevant information within and outside the organization. Marketing managers evaluating the performance of product managers or other personnel involved in new product introductions may also benefit from the results of this study. This study shows, for example, that profit measures are probably not the best yardstick for evaluating the actions of the new product manager in the short-term. For each new product introduction, specific goals have to be specified, and these specific goals can then be assessed with the most appropriate indicators.

The bottom line for the manager is that essentially the present study introduced two new issues: the universality of success measures and the impact of time perspective. The findings indicate that it is necessary to develop an adequate monitoring instrument with which to assess the performance of a certain product given its introduction goals and time perspective. The point to be reinforced here is that regardless of the background characteristics of the firm, it is likely that

the same set of performance measures should be used. Only when time perspective becomes important, should the list of success measures change.

Monitoring a product's performance is important in evaluating whether introduction objectives have been met. In this assessment procedure, the expected life-time of a product and the product category's phase of the product life need to be considered. Such a procedure parallels the importance of observing the length of product development cycles [14]. However, such observations need to be supplemented with the most relevant information for the most appropriate success indicator given a certain time perspective.

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