



# Marketing programmes across different phases of the product life cycle

## An explorative study in the Indian machine building sector

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### Abstract

**Purpose** – This paper seeks to report the findings of a survey aimed at understanding the marketing programmes (MP) for industrial products in different phases of the product life cycle (PLC).

**Design/methodology/approach** – The study is an exploratory one, conducted in a sample of 63 Indian organisations manufacturing general-purpose machinery. Data pertaining to a total of 191 product lines in four phases of the PLC (42 in introduction, 59 in growth, 53 in maturity and 37 in decline phase) were collected using a specially developed questionnaire.

**Findings** – The results of the descriptive analysis revealed that the marketing programme variables emphasised in different PLC were different. In the Introduction phase decisions about product attributes, physical performance of the product, direct mail advertising, quality improvements and differentiation by design were emphasized. In Growth phase: feature additions, improvements in product styling, quality and service and market segmentation. In maturity and decline phases re-tailoring products, sales force efforts were some of the marketing variables emphasised. The results support the views in literature about MP being different in different phases of the PLC. Based on a discriminant analysis, marketing variables that discriminate the different phases of the PLC were also obtained.

**Research limitations/implications** – The study is done in the machine-building industry in one country (India) – this limits the generalizability of the findings.

**Practical implications** – The results can be useful to marketing managers to anticipate the type of strategic MP in future and this in turn can help in planning activities of other management functions like manufacturing and R&D.

**Originality/value** – This study adds to the body of literature, which proposes to plan marketing and business strategies differently at the different PLC phases.

**Keywords** Product life cycle, Marketing planning, Industrial marketing, India, Machining centres, Discriminators

**Paper type** Research paper



### Introduction

The process of economic liberalisation in India has allowed free imports of technology and goods which has led to intense competition and shorter product life cycles (PLC). In such conditions to serve the market needs of lower costs and higher quality, technological developments (TDs) related to product and process improvements become crucial in any manufacturing organisation. The need for continuous changes in

marketing programmes (MP) is being felt by the marketers in these organisations, in order to obtain sustainable competitive benefits through out the life cycle of the product.

A review of literature reveals that there are research studies, which propose MP should be different across the life cycle supporting business strategies (Frohman, 1985; Frohman and Bitondo, 1991). But it appears that there are no comprehensive studies about this issue in the context of industrial products especially in the Indian context.

Based on the discussions held with experts in the area, a relevant literature review (Chandra and Shukla, 1994; Lall, 1995) and observations made in a preliminary study in some Indian organisations producing industrial goods, the following were confirmed – there is an increasing emphasis on differentiated business and marketing strategies in different market situations and also continuous support is being sought from the technology function in the form of product and process developments for gaining competitive advantage.

The main aim of this study is understand the MP for industrial products across phases of the PLC. The following are the objectives for the study – The first one being to make a general descriptive analysis of the MP and the second objective is to identify the MP variables which are dominant in distinguishing between the different phases of the PLC. The results of the study will be useful to both researchers and managers. For researchers, it is hoped to provide insight into the nature of marketing activities of industrial or B2B products in different situations (PLC phases) for managers in the marketing function. It will be helpful to anticipate the changes that need to be made in the strategic MP for the future.

### **Review of some pertinent literature**

The PLC provides an important perspective for the formulation of strategies, because each phase of the life cycle is believed to have distinct characteristics that offset the operation of a business and consequently MP. What may be a relevant strategic consideration in one stage of PLC may be unimportant in another (Abell and Hammond, 1979). One author has even proposed that “the most fundamental variable is determining an appropriate strategy is the phase of the product life cycle” (Hofer, 1975). In addition, the MP, particularly for engineering goods, involves determining attributes of the product offering, studies of product performance in the market, product-in-use strategies, targeting re-purchasers, market segmentation and product differentiation. Product differentiation again can be done by pricing, through design changes and through promotions or in combinations (Webster, 1984).

The MP for a product changes according to the demand and competitive situations for the product during the various phases of the life cycle of the product. There are basically four phases for PLC. They are introduction/market development – where demand for the product is just beginning to grow, growth phase – when there is a high demand/market for the product, maturity phase – where the demand is more stable and finally the saturation/decline phase – where demand falls (Cunningham, 1974; Pessemier, 1977; Thorelli and Burnet, 1981; Kotler, 1991).

### **Elements or components of MP**

Before discussing MP in different phases of the life cycle, it is necessary to understand what is a MP – MP can be looked at as the marketing actions taken by the marketing department of an organisation. Some typical decisions within the four elements of MP are known as marketing mix decisions like those with respect to the product offering

include the quality of product, features, functioning, reliability, service, appearance (including technology and brand name) (Aaker, 1984; Boyd and Walker, 1990). Decisions regarding promotion would include, sales promotion, advertising in media, direct advertising and mailing decisions (Boyd and Walker, 1990; Kotler, 1991). Pricing includes the list price decision, credit facilities, manipulations for special customers, etc.

### MP across different phases of the PLC

The following passages take a look at selected papers that discuss MP in relation to different phases of the PLC.

#### *PLC – introduction phase*

The introduction phase is when a product is first launched. The market will have to be created and developed unless a market ready exists for the products produced or the competitor's product. At the introduction phase, the marketing effort is focused on identifying market needs and specific product characteristics (Levitt, 1965; Cunningham, 1974; Wasson, 1974; Enis *et al.*, 1977) and when the product to be marketed is ready, the effort is towards demand stimulation and to raise the sales from zero to some predetermined level. Marketing activities involve "feedback" of information to engineering and R&D on the product performance, marketing research for customer views of the product and regarding the marketing mix variables.

It takes considerable marketing skills and engineering to get the product accepted commercially and to ensure that product features are in concordance with customer needs. Robert Cooper (1976) in his study on introduction of successful new products mentions that lack of marketing research personnel and activities were thought to have caused more industrial product failure than other resource deficiencies. Feedback of information is important from market for the marketing and R&D/engineering departments (Cunningham, 1974). The selling approach is to create product awareness and trial (particularly for engineering when test marketing is not possible) (Pessemier, 1977). The other activity for the marketing function is matching the product attributes with market needs and giving this as a feedback to R&D/engineering departments (Wasson, 1974) Informative advertising and promotions and large marketing expenditures are prescribed (Fox, 1973; Wasson, 1974; Wind and Robertson, 1983). In this phase, there is not much segmentation of the market (Hofer, 1975). Fox emphasises, the use of sales agents or commissioned salesman (Fox, 1973). Regarding pricing, some authors prescribe high price while some others talk about imposing minimum of value perception learning and to match the value reference perception of the most receptive segments (Wasson, 1974). This is because pricing factors can be effective only after experience and promotion have established the main quality product in the expectation of prospects.

There is a consensus in the literature selected regarding distribution at the introduction stage. Distribution should be selective or exclusive and in the case of industrial goods it should be sold directly (Hofer, 1975; Fox, 1973; Hisrich and Peters, 1984). In the case of products, that have been re-launched with cost reductions, with major modifications of products launched as line extensions (Kotler, 1991), the emphasis is on cost reductions through value analysis or new materials or new processes or major modifications.

More recent studies from the manufacturing management literature highlight that a focus on time and cost reductions in the introductory phases of the PLC help in pricing

in subsequent phases. Niss (1996) in his study of a hundred Danish firms suggests that a symbolic linkage between product and country of origin can be a useful positioning strategy in the beginning of a product's life cycle while at the growth and maturity stages this changes. Hart and Tzokas (2000), in their study of five industries covering both consumer and industrial goods manufacturers in the UK, found results that do not entirely follow the normative view where in the introductory and growth stages of product-market development, high advantage products, with high prices, limited distribution and high promotion expenditures are likely to place the new product for market success. Instead, they found that some of the marketing variables like sales and distribution are equally emphasized in the introduction and growth phases. Nwabueze and Law (2001) in their case studies in the brewery industry founding one of the firms the brand teams do consider monitoring the PLC is of great importance; the firms classified brands based on the state of the PLC and in the introduction phase – it is “development brand”. Such a product would receive above the line support but not a full marketing budget until the product is mature within the market place.

#### *PLC – growth and maturity phases*

The growth stage is where market expansion takes place with a spurt in sales; this is the phase where competitors start moving in, sales volume rise rapidly and so do profits. Attention should be focused on ensuring a workable version of the product is produced in sufficient volumes to gain full market acceptance on quality, price performance and delivery (Cunningham, 1974). Marketing effort is towards efficient distribution and to ensure that a workable version of the product is available in sufficient volumes (Cunningham, 1974). Establishing the brand, expanding distribution, differentiating product, offering product variants (Levitt, 1965; Hofer, 1975; Enis *et al.*, 1977; Hambrick *et al.*, 1982a) are some of the major elements of a MP at this phase. In this phase, marketing is said to be the key factor, and there will be high marketing intensity involving product improvements, addition of variants and intensive and extensive distribution. Increasing sales efforts and advertising for brand image are some other activities (Hofer, 1975). Rumelt talks of achieving economies of scale, concentrating on product performance and increasing access to distribution channels.

Hambrick *et al.* (1982b) in their study found business in growth phase increased their marketing expenditures. Wind and Robertson (1983) stresses on advertising about product merits, product modifications and full distribution. While Pessemer (1977) advocates promotional emphasis on product features. While some authors prescribe to increase sales-force efforts and expenses (Fox, 1973; Wasson, 1974) others have found the sales force expenses to be avoided (MacMillan *et al.*, 1982). Competitive positioning (Hisrich and Peters, 1984) and product differentiation in forms of design (Wasson, 1974) is considered to be a key element for success. Marketing expenditures are large (Pessemer, 1977).

For a product in the maturity phase – stabilisation or leveling off of sales and strong competition characterise this phase. According to Hofer (1975) along with the introduction and decline/saturation phases, the maturity phase of the life cycle is where major changes in strategy are required.

In this phase, marketing tries to maintain market share and sales and at the same time find new markets. Market segmentation (Levitt, 1965; Wasson, 1974; Enis *et al.*, 1977; Hofer, 1975), increasing product line (Hambrick *et al.*, 1982a), increased advertising, increasing complementary products, consolidating distribution, price

reductions (Hofer, 1975; Levitt, 1965; Wasson, 1974) are some of the important elements of MP in this phase. Product differentiations, product differentiation through advertising, reduction of distribution extensity are some strategies given by Wind and Robertson (1983). Segmentation of the market (Hofer, 1975; Wasson, 1974; Levitt, 1965; Smallwood, 1985) is key strategic action.

Some authors state that the product standardization takes place, leading to no possibility for differentiation of the product from the competitors'. Hence, marketing should avoid extra ordinary expenses and go for premium pricing (Hambrick *et al.*, 1982a) and cost reduction strategy (Pessemier, 1977; Hambrick *et al.*, 1982a, b; Thiethart and Vivas, 1984). Other authors stress on superior product quality (Hofer, 1975; Smallwood, 1985), increasing sales force efforts, advertising and marketing expenditures (Pessemier, 1977) and price manipulations (Hofer, 1975; Wasson, 1974). All these activities are keeping in view that the objective is to maintain market share for the product. Cunningham (1974) suggests product modifications, higher marketing expenditures due to discounts, product improvements, price variations are some marketing factors to meet competition for industrial products.

Pessemier (1977) states that the promotional emphasis will be a price and marketing expenditures will be moderate and the selling approach is based on the value of the product. The distribution strategy is to increase intensity and extensity, if the strategy to move to new markets – geographically (Hofer, 1975; Pessemier, 1977; Hisrich and Peters, 1984) or to reduce or maintain the distribution at same level if the option is to maintain the operations in existing markets (Wasson, 1974) i.e. if no market expansion takes place.

Adding complementary products is another marketing strategy used in the maturity phase, called systems selling instead of single product selling (Hisrich and Peters, 1984; Boyd and Walker, 1990). There is another view which is different from the view mentioned earlier viz. that it is not possible to change the product offering. Hisrich and Peters (1984) feel that the product being marketed, would not have changed for a few years, and hence may be reason enough to consider some modifications in its features or function. Product modifications may be sought to enhance customer satisfaction or for moving into new markets and for market segmentation. Product modification may be necessary for cost reduction purposes also (Hisrich and Peters, 1984). Re-examination of design compromises may have to be done leading to re-tailoring of the product (Wasson, 1974; Hofer, 1975).

Promotional emphasis at maturity phase is discussed differently by different authors. Some mention dealer incentives and trade discounts at this phase also for temporarily facing competition and psychographic advertising (Hisrich and Peters, 1984). Promotional emphasis on price is given by Pessemier (1977).

Hofer (1975) discusses in detail all aspects of business strategy at this phase of the PLC. The degree of product differentiation and the nature of buyer needs, he states, are the two important determinants at this phase based on which he presents secondary normative propositions. If the product differentiation is low, Hofer (1975) proposes that the business should attempt to segment the market or seek vertical integration. If the differentiation is low, but other aspects like buyer needs are non-economic, then universal marketing strategy should be used and increase marketing expenditures. In the case of high degree of product differentiation marketing should develop service capabilities and expand geographically or maintain and enhance distinct competencies in their marketing area and seek improvements in their products.

The length of the period of this phase may be stretched by the ability of the organisation to meet competition through product improvements and price variants (Cunningham, 1974). In this phase, product improvements and product variants are

important and major product changes and major adaptations may have to be made for starting a new cycle (Fox, 1973; Wasson, 1974). Cost reductions to make possible market penetration through price manipulations, re-examination of the need for design compromises are also to be looked into (Wasson, 1974).

Fox's hypothesis (1973) at this phase includes development of minor variants and cost reductions through value analysis. Improvements in product design, better product quality, development of new functions and product redesigns for entering new markets are also developments discussed (Pessemier, 1977).

While earlier papers reviewed were from the 60s, 70s and 80s, some selected more recent papers also seem to support the classic papers on PLC and marketing). Niss (1996) in his study of a 100 Danish firms found that brand building through more abstract and emotional imagery becomes increasingly important in the later stages (growth and maturity) of the PLC. Lee *et al.* (1993) in their study of marketing strategies in maturity stage of a rapidly developing market found the products/services improvements strategies and vertical integration are significant.

Nwabueze and Law (2001) in their case studies in the brewery industry also found that once the product is out of the development stage, the second category of classification of their brands stage is "grow aggressively". Here the product is targeted to grow fast within the market place and receives the largest budget compared to the other categories. The third category "long life harvest". A product at this stage will receive below the line support. This is because the company believes that when a product is well established and mature within the market place it does not require a large marketing budget. Thus, through case studies the authors garner support for the PLC concept in a particular industry.

For the decline stage, the marketing objective would be to either "harvest" the product and replace it with a new product or reposition it (Kotler, 1991). To achieve the first objective, MP would involve decisions like reducing distribution intensity and outlets and using pricing strategies to clear off all stocks. The second objective of repositioning the product would involve bringing about design changes in product and/or developing completely new products. Elimination of products from the product line that are not profitable (Wasson, 1974) is the other option.

For the products existing in the market, cost controls by reducing marketing expenses reducing product differentiation, specialising, reducing distribution channels (Smallwood, 1985) are some of the elements of marketing program discussed in literature. Complete withdrawal of all R&D support for a product and its associated process is advocated (Fox, 1973; Wasson, 1974).

In this phase, there is tremendous pressure on the design to reduce costs (Cunningham, 1974). All methods of cost minimisation are advocated by several authors (Pessemier, 1977). This is possible through offering of low-priced product designs (Gregory, 1985).

There is also evidence of user redesigns and new product designs to extend the life of a product in this phase (Pessemier, 1977; Gregory, 1985). Some other authors (Porter, 1982; Kotler, 1991) have also suggested possible existence of more aggressive stances like major developments to extend the market life of the product. In the decline phase, Nwabueze and Law (2001) found the company in their case study had a category called "enjoy milk", which receives very little or no support. The product is considered to have a particular role within the market, where it makes a certain contribution. The final stage of the PLC is termed "kill". It is at this point that the product is discontinued and has no further role within the Bass Brewers portfolio.

The above discussion related to MP leads to reasonably believe that there may be a unique set of MP elements in different phases of the PLC for products already in the market. Also the question that needs to be answered is, which are the marketing variables that distinguish the different PLC phases? Thus such a study attempted here is warranted to understand the MP for industrial products across phases of the PLC.

#### *Methodology of the study*

The study is an exploratory one, conducted in a sample of 63 Indian organisations manufacturing general-purpose machinery. Firm from these industries were chosen as they have been liberalised and facing competition from foreign competition, leading to an increase in marketing activities. Data pertaining to a total of 191 product lines in four phases of the PLC (42 in the introduction phase, 59 in the growth, 53 in the maturity and 37 in the decline phase) were collected through face to face interviews, using a specially developed questionnaire.

A two step methodology was adopted to conduct this study – a pilot study and a main study were done. Initially, 30 variables that are elements of a MP were identified from literature (full list is in Appendix). The pilot study was conducted to elicit specific elements of MP in the four phases of the PLC and also verify and improve the relevance of the variables suggested by literature.

A semi-structured questionnaire with the 30 variables (which were elements of a MP) for products in the four phases of the PLC, viz. the introduction, growth, maturity and decline phases, were used to elicit data from marketing managers in nine organisations that manufactured and marketed general purpose machinery and their components. A “yes/no” scale was provided before each variable and if the answer was “yes” by the executive – the question posed for the executives was to indicate the extent to which the variables were considered important at different PLC phases, on a strongly disagree – strongly agree format for each variable.

The results of the pilot study helped in eliminating two variables which are:

- (1) advertisement utilisation ratio; and
- (2) distribution outlets.

According to the respondents these were not relevant to industrial products in the Indian context.

The study also helped in obtaining the variables relevant to the different PLC phases (based on the perceptions of the respondents. (The variables were selected based on mean scores of the data collected from the questionnaire). These marketing variables that have been elicited for the different PLC phases presented in Table I.

There were some marketing variables common at the different phases; five variables were common between introduction and growth phases, twenty (20) between growth and maturity phases and four between maturity and decline phases but their relative importance was different. These variables have not only been identified by practicing managers, but also find support in literature too (Wasson, 1974; Fox, 1974; Smallwood, 1984; Pessemier, 1977; Hofer, 1975; etc.).

The questionnaire was developed using the variables described earlier. The final instrument has three main parts:

- Demographic details of the organisations.
- Questions to elicit data on the variables that are elements of marketing programmes at the four Phases of the PLC.

Introduction phase	Growth phase	Maturity phase	Decline phase
<p>Determination of product attributes                      Product in use studies                      Direct mail advertising                      Need determination in old markets                      Need determination in new markets                      Physical performance of the product                      Innovative promotions                      Marketing expenditures                      Sales force efforts</p>	<p>Improve quality                      Improve styling                      Modifications by process                      Physical performance of product                      Feature additions                      Product line changes                      Changes in product features                      Complementary products                      Product in use studies                      Existing markets                      New markets                      Innovative promotions                      Geographical expansions                      Service improvement                      Differentiation by design                      Distribution by intensity                      Market segmentation                      Differentiation by price                      Distribution extensity                      Brand awareness                      Price manipulation                      Sales force efforts                      Marketing expenditure</p>	<p>Improve quality                      Improve styling                      Modifications by process                      Sales credit                      Feature additions                      Product line changes                      Retailoring products                      Complementary products                      Product in use studies                      Existing markets                      New markets                      Innovative promotions                      Geographical expansions                      Service improvement                      Differentiation by design                      Distribution by intensity                      Differentiation by promotion                      Differentiation by price                      Repurchasers                      Market segmentation                      Distribution extensity                      Brand awareness                      Price manipulation                      Sales force efforts                      Marketing expenditure</p>	<p>Service improvements                      Differentiation by design                      Differentiation by promotion                      Differentiation by price                      Improve quality                      Retailor products                      Product line changes                      Sales force efforts                      Marketing expenditures</p>

**Table I.**  
 MP variables at different phases of the product life cycle (elicited through the pilot study and supported by literature)



*The unit of analysis.* The questions regarding MP were related to a specific product line, for which the organisation had a separate MP. All the variables except the ones on demographic aspects were measured using Likert type 5-point bi-polar scales.

*Content validity.* The content validity of the questionnaire used in the present study was established during the preliminary and pilot studies. The variables and their relevant scales deemed irrelevant by responding executives were removed and those which the respondent felt were important was added in the final instrument.

*Reliability.* Cronbach Alpha is used to measure the reliability of the different groups of measures viz., MP across different phases of the PLC. The reliability coefficient for the measures of MP for each of the four sections representing the four phases viz. of the PLC are all >0.75. All these coefficients are satisfactory as a reliability coefficient of a 0.70 or more is considered adequate. Thus, the questionnaire used to collect data is considered to be a valid and reliable one.

#### *Data collection methods*

All data for the study was primary data and was obtained from a field survey. A questionnaire was developed using the marketing variables in different phases of the PLC – a 5 point likert type scale was used to measure the variables. The data was collected through face-to-face interviews from the respondents along with the filling up of the questionnaire already detailed. This ensured that the managers, who were directly involved in the designing the MP for the concerned products, responded to the questions.

The data collected pertained to product lines in various phases of the life cycle viz., introduction, growth, maturity and decline phases. The respondents were asked to identify products which according to them were in the different PLC phases (The definition of the PLC phases used by Thorelli and Burnett (1981) was given as a reference). The unit of analysis is a product line being manufactured and marketed by the organisations chosen as the sample for the study.

A cross sectional design has been adopted to conduct the study following the studies of Thorelli and Burnett (1981) and Thiethart and Vivas (1984). According to these authors it is reasonable to assume that the observed differences in strategies and performances of the various business life cycle stage groups are similar with observations of businesses in a truly longitudinal design. Also gathering data with longitudinal design is virtually impossible in the time frame of this study.

#### *Data analysis*

To achieve the first objective is to make a general descriptive analysis of the MP is done using means. The second objective pertains to identifying the MP which are dominant in distinguishing between the different phases of the PLC. A discriminant analysis is performed to get dominant variables of MP that discriminate between each pair of phases of the PLC. The analysis was done between the following pairs of PLC phases:

- Introduction and growth phases
- Growth and maturity phases and
- Maturity and decline phases.

**Results of the study***Descriptive analysis of MP at different PLC phases*

First the results of descriptive analysis of the MP at the four phases of the PLC are presented. To get a broad appreciation of the variables of MP means and standard deviations of each variable were used.

*MP emphasised in PLC introduction phase*

In addition to the means, in the Introduction phase to get an idea of the type of products that are being newly launched into the market in this sector – the classification method of newly introduced products, as done by Booz, Allen and Hamilton, was used. Table II gives the frequencies of these products types.

It can be seen from the that a majority of the products launched into the market are newer versions of the products already existing in the market. Only 9.5 per cent of the products are really completely new to the market.

The means and standard deviations of all marketing programme variables for products in the Introduction Phase are given in Table III. It can be seen from the table that product-in-use studies, marketing expenditures and market segmentations are the ones with the highest means. They also have the highest frequency score on the “5” on “4” scale values in the questionnaire (more than 50, 55 and 50 per cent, respectively). The other variables that appears to have high support are production attribute determination, need determination in new markets and existing markets.

Overall in this phase it appears that the emphasis is on decisions regarding markets and market intelligence. The data indicates low support to innovative promotions, advertising and direct mail inquiries and sales force efforts. This low emphasis on promotion related elements is unlike that for consumer goods, for which the introduction phase is characterised by high amount of advertising and promotions.

Product type	% of respondents
1. Totally new to the market	9.5
2. Line extensions	47.6
3. Cost reductions	26.2
4. Improved versions of existing ones	16.7

**Table II.**

MP elements	Mean	Standard deviation
Product attribute determination	3.31	1.07
Product in use studies	3.36	1.16
Advertising inquires/direct mail	2.69	1.30
Existing markets	3.21	1.22
New markets	3.29	0.97
Determine physical performance	2.86	1.26
Innovative promotions	2.29	1.17
Market segmentation	3.33	1.12
Sales force effort	2.79	1.18
Marketing expenditure	3.36	1.01

**Table III.**  
Means and standard  
deviations of MP  
variables in PLC  
introduction phase  
(*n* = 42)

*MP emphasised in PLC growth phase*

Table IV presents the marketing programme variable in the growth phase and their respective means and standard deviations. In this phase, it can be seen from the table that existing markets, seeking quality improvements, price manipulations appear to be important in terms of their means.

The variables that follow these in terms of their mean values are – differentiation by design, entering new market, increasing product features, improve product styling and determining product’s physical performance (with more than 50 per cent of the respondents reporting on “high” scores). The other variables that appear to have high support are sales force efforts, product-in-use studies and marketing expenditures with 50 per cent of the respondents highly supporting them.

The variables quality improvement, styling improvement and function changes can be called as product development related programmes. Product physical performance, product-in-use studies can be construed as as market research portion of marketing programmes. Thus, it may be inferred that in this phase, penetration in the existing market, with product development related programme, product differentiation by design are important. Entering new markets and market-expenditures and sales force efforts are important to a lesser extent.

*Marketing programmes emphasised in PLC maturity phase*

The five MP variables that are prominent in terms of their means are market segmentation, need determination in new markets, improve product styling, targeting re-purchases and improving product quality (with 60.4, 56.6, 56.6, 56.1 and 60.4 per cent of respondents reporting high scores, respectively, Table V).

MP elements	Mean	Standard deviation
Determine physical performance	3.42	1.07
Product in use studies	3.22	1.16
Product line changes	2.14	1.07
Improve quality	3.69	0.97
Improve styling	3.42	1.00
Feature additions	3.47	0.95
Comply products	3.05	1.11
Existing markets	3.80	0.78
New markets	3.47	1.01
Product modifications	2.75	0.94
Differentiation by design	3.54	0.90
Distribution by intensity	2.37	1.22
Geographical expansions	3.17	1.07
Brand awareness	2.44	1.34
Innovative promotion	2.17	1.05
Market segmentation	3.37	1.11
Service improvement	2.42	1.29
Distribution extensity	2.98	1.14
Direct mail/Advertising inquires	3.31	1.10
Price manipulations	3.63	0.98
Sales force efforts	3.31	0.81
Marketing expenditures	3.15	0.93

**Table IV.**  
Means and standard deviations of MP variables in PLC – growth phase (n = 59)

MP elements	Mean	Standard deviation
Improve quality	3.55	1.12
Improve styling	3.68	1.00
Modifications by process	3.06	1.15
Sales credit	3.13	1.14
Feature additions	3.30	1.08
Product line changes	3.13	0.96
Retailing products	3.04	1.27
Complementary products	3.09	1.16
Product in use studies	2.85	1.17
Existing markets	3.19	1.09
New markets	3.62	0.92
Innovative promotions	2.51	1.30
Geographical expansions	2.96	1.18
Service improvement	2.55	1.34
Differentiation by design	3.1	1.00
Distribution by intensity	2.89	1.09
Differentiation by promotion	2.66	1.22
Differentiation by price	2.85	1.10
Repurchasers	3.66	0.98
Market segmentation	3.70	0.95
Distribution extensity	3.15	1.18
Brand awareness	2.83	1.34
Price manipulation	2.62	1.08
Sales force efforts	3.15	0.97
Marketing expenditure	3.45	1.05

**Table V.**  
Means and standard  
deviations of MP  
variables in PLC –  
maturity phase  
( $n = 53$ )

The other elements that appear to be important in terms of their means) are marketing expenditures, product feature additions, sales force efforts. need determination in existing markets, differentiation by design, product line changes, service improvements, adding complementary products and product modifications by process or by re-tailoring them.

In this phase, it appears that the emphasis is more towards market development programme elements like entering new markets or market segmentation, then product development efforts – with utility additions or modifications being emphasised.

#### *MP emphasised in PLC decline phase*

Table VI presents the MP variables their means and standard deviations in PLC Decline Phase.

MP elements	Mean	Standard deviation
Service improvement	2.86	0.95
Differentiation by design	2.70	0.85
Differentiation by promotion	2.89	0.91
Differentiation by price	3.59	0.80
Improve quality	3.19	1.02
Retail products	3.97	0.64
Product line change	2.84	1.12
Sales force efforts	3.27	0.80
Marketing expenditure	2.89	0.97

**Table VI.**  
Means and standard  
deviations of MP  
variables in PLC –  
decline phase  
( $n = 37$ )

Re-tailoring products, differentiation through pricing are the ones that have the highest mean values in this phase. Sales force efforts and improving product quality are the other variables that appear to be important. Re-tailoring products and differentiation by price have 68.4 and 64.9 per cent of respondents supporting them with high scores. While the other two variables with relatively high support have 45.9 and 43.2 per cent respondents supporting them.

To sum up the results seem to reveal that the set of MP variables emphasised at each PLC phase was unique. The following paragraphs give some instances of this: The MP variables that were emphasised were as follows, In the Introduction phase, product attributes determination, determination of the physical performance of the product, direct mail advertising seem to more emphasised while need determination in existing markets, seeking quality improvements, differentiation by design, etc. appear to be important in the growth phase. In the maturity phase feature additions, improvements in product styling, quality and service and market segmentation and in the decline phase, re-tailoring products, sales force efforts were some of the variables of marketing programmes that were emphasised in the sample organisations.

### **MP across different phases of the PLC – a discriminant analysis**

In this section, the results of the discriminant analyses for identifying the variables of MP that distinguish between the different PLC phases are presented.

The MP Variables relevant to each phase of the PLC have been extracted from the pilot study. Only two of these variables were common to all the phases of the PLC. Therefore, no attempt was made to carry out a multiple discriminant analysis across all phases. A two-group discriminant analysis between each pair of the PLC phases was considered the appropriate procedure. The analysis was done between the following pairs.

- (1) Introduction and Growth
- (2) Growth and Maturity, and
- (3) Maturity and Decline phases.

In this paper, and also from the theoretical point of view, we are interested only in the variables that distinguish between “introduction and growth”, “growth and maturity”, and “maturity and decline” phases of the PLC. This is because a product goes through the different phases of its life-cycle in this sequence. Direct changes from the introduction to maturity, introduction to decline and growth to decline phases are considered not relevant and are left out of the analysis without much loss of generalisation.

The results of the discriminant analysis (done using SPSS package) are presented. Through out this section, the Standardised Canonical Discriminant Function Coefficients and the Structure Correlations Tables show only the variables with co-efficients and correlations greater than 0.3 (as recommended by Hair *et al.*, 1992).

### **Discriminant analysis of MP between introduction and growth phases**

Table VII summarises the results of the step-wise discriminant analysis of the MP variables between introduction and growth phases.

Seven of the nine MP variables that are common between the introduction and growth phases were selected when Wilks Lambda reached the lowest level.

The function is significant (0.0000) and the canonical correlation is quite high (0.5642). Thus, it is useful in discriminating between the two phases though the function does not provide a very high degree of separation, as indicated by the Wilks

## Variables

	<i>Coefficients</i>	<i>Correlations</i>
Existing markets	0.8195	
Marketing expenditures	-0.6792	
Direct mail advertising	0.4870	
Sales force effort	0.4431	
Product-in-use-studies	0.4202	
Product physical performance	0.3545	
Innovative promotions	0.3305	
<i>Structure correlations</i>		
Existing markets		0.4293
Sales force efforts		0.3850
Direct mail advertising		0.3771
Product physical performance		0.3580

**Table VII.**  
Marketing program variables – discriminators between Introduction and growth phase

Lambda (0.6817). The groups' centroids reported in the table show that group 1 (Introduction phase) is separated from group 2 (growth phase). Further the predictive results of the discriminant function show that 72.28 per cent of the products under the study were correctly classified. Therefore, we conclude that the function is significant.

To select the dominant discriminating variables, the Standardised canonical discriminant function coefficients are used along with the structural correlations. From the table, the dominant discriminant variables according to the discriminant function are existing markets and marketing expenditures. Based on the structural correlations also, variable existing markets is the dominant variable. Thus, between these two phases, existing markets is considered as the dominant variable. Marketing Expenditure is also considered dominant based on standard weights (though it's structural correlation is only -0.1552).

### Discriminant analysis of MP between growth and maturity phases of PLC

Thirteen of the 20 MP variables that are common between the growth and maturity phases were selected when Wilks Lambda reached the lowest level.

The canonical correlation coefficient was quite high (0.7694), and the function is significant (0.000). Thus it is useful in discriminating between the two phases, though it does not provide a high degree of separation as indicated by the Wilks Lambda (0.4081). Further the predictive results, according to the classification results of the discriminant function showed 82.14 per cent of the cases are grouped correctly.

Table VIII presents the discriminant weights/coefficients and the structure correlation coefficients of the 13 variables that were selected when Wilks Lambda reached the lowest level.

Only two of the variables have structure correlations of >0.3 hence have been provided in the table. Thus from the above table, the dominant discriminating variables are:

- price manipulations; and
- feature additions (based on its discriminant function weight).

**Table VIII.**  
Marketing programme  
variables –  
discriminations between  
growth and maturity  
phases

Variables	Coefficients
Price manipulations	0.7265
Feature additions	0.6029
Existing markets	0.5877
Product-line-changes	-0.5359
Marketing expenditure	-0.5289
Improve styling	-0.4921
Market segmentation	-0.4207
Brand awareness	-0.3847
<i>Structure correlations</i>	<i>Correlations</i>
Price manipulations	0.4087
Product-line-changes	-0.4076

Product line changes, along with price manipulations, are dominant when structure correlations are the criteria.

### MP between growth and maturity phases of PLC

Six of the nine variables that were common in the maturity and decline phases of the PLC were selected when Wilks Lambda reached the lowest level. The discriminant function was significant (0.000) and had a high canonical correlation (0.6272), though it does not provide a high degree of separation (Wilks Lambda 0.6272). Further, the predictive results of the discriminant function according to the classification results of this analysis gives 78.89 per cent of the products as properly classified. Therefore, we may conclude that the function is significant.

Table IX provides the Standardised discriminant function weights and the structure correlations of the variables in the discriminant function.

From the Table IX, we can see that the dominant variable is retailing products – in terms of its discriminant weight and also structure correlation. In addition, differentiation by price and marketing expenditures are also taken into consideration because the former has the second highest structure correlation coefficient while the latter has the 2nd highest discriminant weight.

The dominant discriminating variables of MP between the three pairs of the PLC phases have been extracted with the help of discriminant analysis. These variables will form the basis for generation of hypothesis to be tested.

### Summary of the discriminant analysis of MP between different phases of the PLC

From the results of the discriminant analyses, it was possible to obtain dominant MP variables between pairs of phases of the PLC. The dominant variables obtained from the discriminant analysis of MP variables between the introduction and growth phases are (1) Marketing expenditures and (2) Need determination in existing markets (Table X).

Price manipulations, product features additions and product line changes are the dominant discriminating variables obtained from the discriminant analysis of MP variables between growth and maturity phases. The discriminant analysis of Marketing

## Variables

	<i>Coefficients</i>
Retailoring products	0.6152
Marketing expenditures	-0.5263
Differentiation by design	-0.5211
Differentiation by price	0.4523
Differentiation by promotion	0.3526
Sales force effort	0.2336
<i>Structure correlations</i>	<i>Correlations</i>
Retailoring products	0.5694
Differentiation by price	0.4876
Marketing expenditures	-0.3566
Differentiation by design	-0.3335

**Table IX.**  
Marketing programme variables – discriminators between maturity and decline phase

	Between introduction and growth phases	Between growth and maturity phases	Between maturity and decline phases
MP variables	Existing markets Marketing expenditure	Price manipulations Feature additions Product line changes	Retailor products Marketing expenditures

**Table X.**  
Dominant marketing programme variables between pairs of PLC phases

variables helped in identifying the following variables which were dominant in discriminating between the maturity and decline phases of the PLC. They are

- Re-tailoring products
- Marketing expenditures.

### Conclusions

The process of economic liberalisation in India has allowed free imports of technology and goods – which has led to intense competition and shorter PLC. This situation has brought about a greater need for the marketing function in industrial organisations to have differentiated programs across different phases of the life cycle of a product. These effects have been particularly evident in Indian industrial goods organisations, which have been undergoing a sea change in the marketing of their products. The present study has been an attempt to understand MP across different phases of the PLC for industrial products. The study is an exploratory one, conducted in a sample of Indian organisations manufacturing general purpose machinery. The results of the study should be useful to marketing managers as they can help anticipate the type of strategic MP in future and this in turn can help in planning activities of other management functions especially manufacturing and R&D.

The descriptive analysis revealed that the MP variables emphasised in different PLC were different. MP variables that were emphasised were as follows: In the Introduction phase, determination of the product attributes, determination of the physical performance of the product, direct mail advertising; need determination in existing markets, quality improvements and differentiation by design. In the Growth phase: feature additions, improvements in product styling, quality and service and



market segmentation. In the maturity phase and in the decline phase re-tailoring products, sales force efforts were some of the MP variables of that were emphasised in the sample organisations.

A discriminant analysis was performed in order to identify the dominant MP that discriminate between pairs of phases of the PLC. Unique sets of these variables that are dominant in discriminating between successive phases of the PLC were obtained: MP variables of need determination in existing markets and marketing expenditures were the dominant ones in discriminating between Introduction and growth phases. Price manipulations, product line changes and feature additions were dominant in discriminating between growth and maturity phases. The dominant variables that discriminated between maturity and decline phases are re-tailoring products, differentiation by price and marketing expenditures. This result indicated that there are MP variables that can distinguish between pairs of phases of the PLC.

The results of the study seem to support the views in literature about MP being different in different phases of the PLC. Some of the papers reviewed which involved both empirical and case study type research – also attest to MP being different phases of the PLC. This study adds to the body of literature which proposes to plan marketing and business strategies differently in differently at the different PLC phases.

Methodologically the present study was a field study of the MP in different phases of the PLC. The Study was highly structured and yielded useful insights into the phenomenon. The present study, being partly an exploratory one has taken into account only the phase of the PLC in studying the concepts. Along with the PLC phase each product/market has its own environmental characteristics like supplier concentration, buyer concentration, promotional elasticity etc. which also influence the MP. Consequently, one can expect marketing programmes to be different accordingly. Different organizations have different goals for example – some have long term goals of maximizing market share and some prefer short term goals of maximizing profits. Such strategic foci/goals of organisations have also been found to have influence on MP. A more complete study of the relationship of MP in different marketing environments and taking into consideration the strategic goals of the organization, would enhance the usefulness of this research.

The study has been done with specific reference to the Indian general purpose machinery manufacturing sector. The patterns observed in this sector need not necessarily prevail in other sectors. More research endeavors in other industrial sectors would be useful to determine the difference in patterns of MP. This would also be useful in generalising the findings. Such studies if done in other countries which have also gone through changes by the process of opening up their economies, would offer good lessons in marketing

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**Appendix. The 30 marketing programme variables elicited from literature**

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Marketing programme elements

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1	Improve quality	16	Distribution by intensity
2	Improve styling	17	Differentiation by promotion
3	Modifications by process	18	Differentiation by price
4	Sales credit	19	Repurchasers
5	Feature additions	20	Market segmentation
6	Product line changes	21	Distribution extensity
7	Retailoring products	22	Brand awareness
8	Complementary products	23	Price manipulation
9	Product in use studies	24	Sales force efforts
10	Existing markets	25	Marketing expenditure
11	New markets	26	Product attribute determination
12	Innovative promotions	27	Product physical performance
13	Geographical expansions	28	Changes in product features
14	Service improvement	29	Advertisement utilisation ratio
15	Differentiation by design	30	Distribution outlets

**Note:** The ones in red were eliminated through a Pilot Study

**Table AI.**

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