

PRODUCT LIFE CYCLE CONCEPT USE AND APPLICATION BY MARKETING DECISION-MAKERS IN SMALL SOUTH AFRICAN ORGANISATIONS

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The purpose of the study was to test the underlying theory of the product life cycle concept with the primary objective of establishing what the use and practical value of the product life cycle concept is in making marketing decisions in small manufacturing and dealer organisations in Gauteng.

The main focus was to test the ability of marketing decision-makers in these small organisations to associate their application and use of the product life cycle concept with Kotler's assumptions on marketing characteristics, described marketing objectives and proposed marketing strategies.

A major finding was that small organisations tended to display a marketing knowledge level with the existing marketing theory. Another important conclusion of the study was that the current product life cycle concept theory needs to be broadened to include strategies on the expanded marketing mix.

Apart from the different use and application by marketing decision-makers in small organisations in South Africa the product life cycle concept theory has potential as a strategic tool and a high likelihood for its future use as a marketing decision-making instrument.

Key words: marketing decisions, product life cycle

INTRODUCTION

The marketplace is changing at a radical pace as a result of major societal forces such as technological advances, globalisation, consumerism and increased competition (**then to select the strategy best fitting the sales, cost, profit, competitor and customer conditions in that phase.**

The PLC concept is a Kotler 2000). Today's organisations are facing their toughest competition ever and organisations continue to strive to retain customers by outperforming their competitors.

Organisations are doing a great deal of soul-searching to outperform the competition. To cater for the above-mentioned developments through re-engineering, outsourcing, e-commerce, benchmarking, forming alliances, becoming more market-centred, becoming global and/or local and decentralising, organisations may utilise a decision-making instrument/tool such as the PLC concept. These developments increase the necessity for organisations to develop and monitor strategies and tactics in a formalised way.

Marketers manage their offerings through the various phases of the PLC by using, inter alia, the marketing mix variables in their decision-making. Marketing decisions are often based

on models such as the Boston Consulting Group Matrix and the General Electrical Strategic model. Subsequently, many marketing instruments are available to marketing decision-makers and various concepts such as the PLC have been developed to assist in marketing decision-making.

The PLC concept allows marketing managers to forecast and conduct strategic planning to manage their products and/or services through the various phases of their respective product life cycles. The purpose of this concept is to determine the phase in which the organisation's product is currently, and valuable instrument available to mainly large organisations for use in the management of their product(s) after commercialisation.

This study investigated the PLC concept theory and its applicability as an instrument in the marketing decision-making for small manufacturing and small service organisations in South Africa. The empirical part of this study was executed among small manufacturing organisations and small dealer organisations in Gauteng, South Africa. The PLC concept's assumptions on marketing characteristics, marketing objectives and marketing strategies described by Kotler (2000) were tested within this target group.

PROBLEM STATEMENT

The PLC concept has been formulated as an explicit, verifiable illustration of sales behaviour and tested against actual data in many studies (Rink 1976; Ayal 1981; Harrel & Taylor 1981; Qualls, Olshavsky & Michaels 1981; Thorelli & Burnett 1981; Tigert & Farivar 1981; Birou, Fawcett & Magnan 1998; Grantham 1999; Roden & Fox 1999; Magnan, Fawcett & Birou 1999 and Shankar, Carpenter & Krishnamaruthi 1999). It is furthermore evident from these studies that the PLC concept has been applied to many situations ranging from the manufacturing industry to financial management.

The PLC concept depicts sales over time and it is a relatively good predictor of sales behaviour in certain market situations but questions can be raised pertaining to its practical applicability. When tested in an explicit form for given categories of goods, the PLC concept can be a useful tool for marketing planning and sales forecasting (Polli & Cook 1969).

Various writers in the academic and in the business press have however questioned and criticised the PLC concept (Dhalla & Yuspeh 1976; Thorelli & Burnett 1981; Midgley 1981; Sproles 1981; Tellis & Crawford 1981; Mercer, 1993 and Grantham 1999).

Criticisms of the PLC concept include (Grantham, 1997):

- Doubt about the applicability and validity of the PLC concept as a marketing instrument.
- No evidence exists of the efficacy of the PLC as a PLC concept/instrument to predict marketing strategy.
- Difficulties in determining the phase of the PLC for a product or service.

The application of the PLC concept for marketing decision-making has been tested in mainly large organisations around the globe but has not yet been researched and tested in South

Africa among large, medium or small organisations. The detailed literature indicates that the PLC concept has been applied to mainly large organisations and to a variety of products, industries and situations such as industrial products, houseware products, high technological products, fashion products, pharmaceutical products, international trade, functional strategic alignment, financial management, benchmarking and for growth purposes.

Based on the criticism, doubt and the fact that the PLC research was conducted mainly in large organisations, the researcher conducted empirical research on the use and application of the PLC concept as a decision-making instrument among small organisations in South Africa.

RESEARCH OBJECTIVES

The primary research objective of this research was to establish what the use and practical application of the PLC concept is in marketing decision-making in small manufacturing and small dealer organisations in Gauteng, South Africa.

The secondary research objectives were:

- To identify the application of marketing decision-making variables in the various phases of the PLC concept by small organisations.
- To investigate the ability of small organisations to describe the marketing objectives within the various PLC phases as indicated in the theory.
- To establish the ability of small organisations to identify PLC characteristics as depicted in marketing literature.
- To investigate the ability of small organisations to link marketing strategies with phases of the PLC theory according to the theory classification.
- To identify the different marketing objectives that small organisations formulate for their products in each phase of the PLC.

RESEARCH DESIGN AND METHODOLOGY

A research design is a blueprint for conducting a research project. It details the procedure necessary for obtaining the required information, and its purpose is to design a study that will test hypotheses or propositions of interest, determine possible answers to the research questions and provide the information needed for decision-making (Malhotra, 1996).

The methodology employed during this exploratory research included sampling, questionnaire design and data analysis.

Sampling

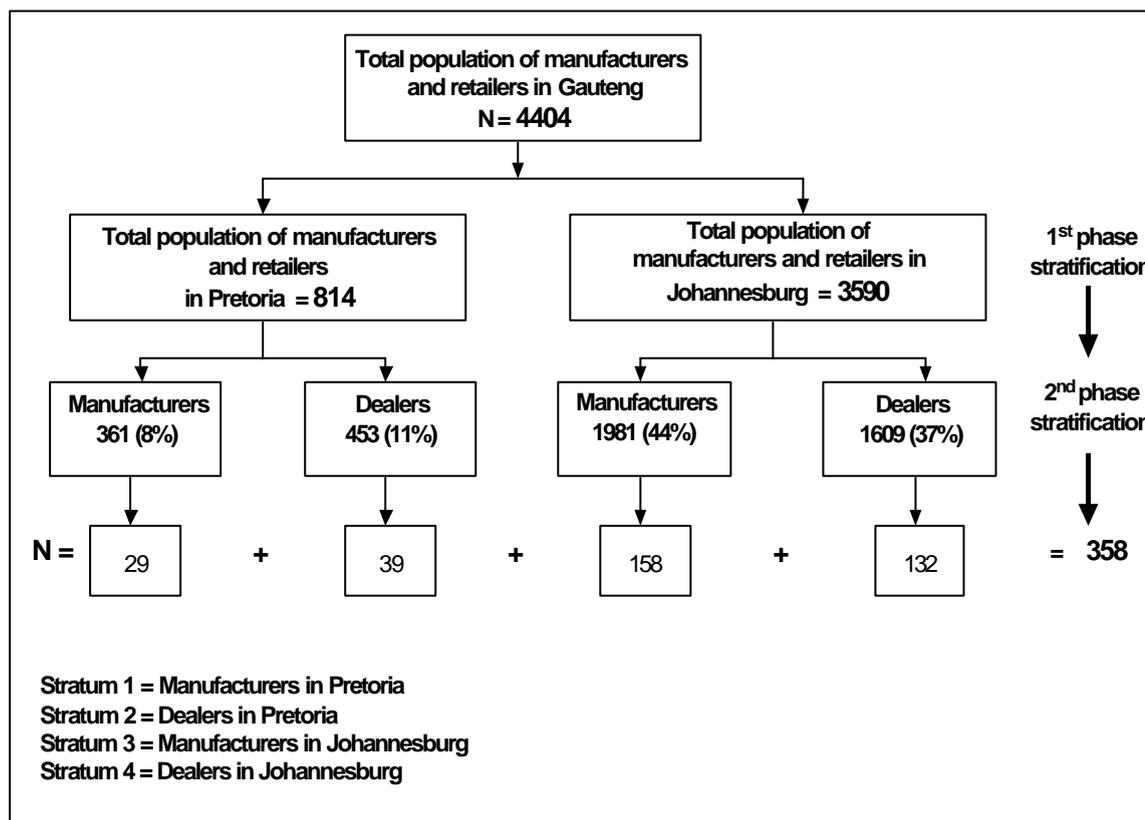
The basic principle of sampling is that by selecting some of the elements in a population, a researcher may draw conclusions about the entire population (Malhotra, 1996). The population selected for this study was small organisations in South Africa across the

Standard Industrial Classification (SIC) of all economic activities. The *survey population* selected was all small organisations in Gauteng, South Africa. Small organisations were selected based on their contribution of almost 57% of the people employed in the private sector in South Africa and a 42% contribution to the Gross Domestic Product (Ntsika, 1999). The *sample frame* was small manufacturers and dealers (wholesalers and retailers) in Gauteng as obtained from the Bureau of Market Research (BMR) list and the *sample units* were all small manufacturers and dealers (wholesalers and retailers) in Gauteng, with 11 – 50 employees.

A two-phased stratified sampling procedure for small organisations (small manufacturers and small retailers) was executed and is illustrated in Figure 1 below.

The sample elements were selected systematically from the sample frame (BMR list). The sample elements in each stratum were as follows: every 13th (29/361) element for stratum 1, every 12th (39/453) element for stratum 2, every 13th (158/1981) element for stratum 3 and every 12th (132/1609) element for stratum 4.

Figure 1: A two-phased stratified sampling



Questionnaire design

A 13-page questionnaire, including 20 open and closed-ended questions, was developed based on the literature and the principles associated with questionnaire design (Dillon, Madden and Firtle). The questionnaire was divided into five distinct sections:

- Introduction, qualification and screening questions
- Section A: Classification questions
- Section B: Specific product life cycle (PLC) questions
- Section C: PLC related to strategic marketing, strategic planning and marketing mix variables
- Section D: The importance of the marketing mix variables, PLC characteristics and strategies linked to the different phases of the PLC

The questionnaire can be viewed at <http://upetd.up.ac.za/thesis/available/etd-06132002-085415>.

For the purposes of the closed-ended questions, a 5-point Likert scale was used and the scale values were labelled from “not important at all”, indicated by a scale value of 1, to “extremely important”, indicated by a scale value of 5. A “don’t know” option was included to make provision for the probability that respondents might not be familiar with the application of the PLC concept on all the aspects in their organisation. *Pre-testing* was done and the final questionnaire was divided into five distinct sections.

Data analysis

The researcher used mean substitution on scaled questions where the scale values were replaced by the mean score of all the other respondents. A mean response strategy was employed to report tendencies, dispersions and distribution in the data. Standard deviations were used to report variability in the data. Furthermore, cross tabulations were used on variables and to compare results achieved on the total realised sample and per organisational type – small manufacturers and small dealers in Gauteng. Ttests were employed to determine whether differences identified between groups and/or variables were significant or not. The researcher utilised content validity to indicate that the measurements used captured the characteristics of interest.

The following research proposition was formulated and tested:

- P1: Small manufacturing organisations and small dealer organisations in Gauteng, South Africa do not have a marketing function responsible for applying the PLC concept when marketing strategy is developed and marketing decisions are taken.
(This proposition was linked to question 4 in the questionnaire)
- P2: Marketing managers of small organisations in Gauteng, South Africa use the PLC concept to plan and manage their products strategically through the various phases of the PLC.
(This proposition was linked to questions 2, 11, 13 and 17 in the questionnaire)
- P3: Small organisations in Gauteng apply and use the PLC concept for marketing decision-making purposes.
(This proposition was linked to questions 2 and 17 in the questionnaire)
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RESULTS

The results provided will be based on the studies realisation rate, results of the total sample and the results per group – small manufacturers and small dealer organisations in Gauteng. It is also important to report that normality testing was employed to test whether the data in the data set was normally distributed or not. These tests indicated that the data set was not normally distributed and therefore non-parametric statistics were employed for analytical purposes.

Due to the length restriction applicable to this paper, only supporting Tables will be provided when group results are reported. During the discussion of the PLC concept application results in paragraph 5.2.3 reference will be given to the relevant questions as they appeared in the final questionnaire. The final questionnaire is available at <http://upetd.up.ac.za/thesis/available/etd-06132002-085415>.

The realisation rate

Personal interviews were conducted with marketing decision-makers and a 7.39% realisation rate was achieved. The reasons for the low overall realisation rate of 7.39% are:

- a large number (20%) wrong numbers appeared on the sample frame (BMR list);
- three calls made to 10.89% of the numbers listed where no answer was received, and
- a large number (59.95%) of the organisations listed on the BMR do not know of and/or do not apply the PLC concept.

PLC concept usage results for the total sample

The results achieved by the total sample on the degree of control, the likelihood of future use and the importance of the marketing mix instruments will be discussed in the next section.

Degree of control over the marketing mix instruments

The majority of 54.35% of the total sample indicated that had have full control over product as a marketing mix instrument, followed by control over people (48.91%), price (41.30%), processes (39.13%), promotion (38.04%), physical evidence (36.96%) and place (35.87%).

Likelihood of continuing with the use of the PLC in future for general management and marketing decision-making

The likelihood that marketing decision-makers in small manufacturing and small dealer organisations will continue using the PLC concept for marketing and general management decision-making in future is an important indicator of the utilisation potential and value of the PLC concept. The majority of 63.04% of the marketing decision-makers in organisations in Gauteng indicated an average (a scale value of 3) to high likelihood of the continued use of the PLC for general management decision-making in future. This result provides a positive indication that the PLC concept has a continuous usage potential among manufacturers and dealers in Gauteng for general management decision-making purposes in the future.

PLC concept application results for the total sample

The PLC concept's application is based on the assumptions provided by Kotler (2000) on marketing characteristics, marketing objectives and marketing strategies as highlighted below:

Marketing characteristics

The marketing characteristics assumption applications by marketing decision-makers were determined by the following question:

Q 18: Match the following characteristics in Column A to the most appropriate phase in Column B by means of a cross next to the word or description in Column A.

- The total sample of small organisations in Gauteng achieved a 75% match with the characteristics in each PLC phase as provided by theory (Kotler, 2000).
- Marketing decision-makers in small manufacturing and small dealer organisations with a marketing department provided a relatively good association (62%) with Kotler's theory as far as the characteristics in the different PLC phases are concerned.
- Marketing decision-makers in manufacturing organisations with a marketing department or function provided a better fit with Kotler's theory on the characteristics in the different PLC phases than dealer organisations with a marketing department or function.

Marketing objectives

The marketing objective assumption applications by marketing decision-makers were tested by the following question:

Q 16: Provide a short description of the appropriate marketing objective that you would associate within each phase of the PLC.

The total sample described marketing objectives, in the different phases of the PLC, which are relatively similar to the theory, provided by Kotler (2001).

Marketing strategies

The marketing strategy assumption applications by marketing decision-makers were tested by the following question:

Q 20: Link the following strategies in Column A to the most appropriate phase in Column B by means of a cross next to the strategy described in Column A.

- The total sample provided a 45% linkage with Kotler's theory on marketing strategies in each PLC phase.
- The total sample showed the best linkage with the strategies on product (75%) and the weakest linkage with price strategies (25%) and distribution strategies (25%).
- The total sample associated the marketing strategies in the PLC phases differently (more than 50%) from those marketing strategies predicated in theory.
- Marketing decision-makers in manufacturing and dealer organisations with a marketing department or function concurred slightly more with regard to strategies used in the different phases of the PLC when compared to Kotler's theory.
- More than three-quarters of manufacturing and dealer organisations in Gauteng engage in strategic marketing planning and development by using the PLC phases.

- Price is the major aspect responsible for creating a competitive advantage.
- Marketing decision-makers in small organisations provided primary marketing objectives in each PLC phase: high/maximum sales, increased advertising and sales promotion in the introductory phase, high/maximum sales and low price in the growth and maturity phases respectively and high/maximum sales, increased advertising & sales promotion and evaluating the product in the decline phase.

Group differences

The next section will provide group difference results based on the responses provided by marketing decision-makers in small manufacturing and small dealer organisations.

Differences in the degree of control over the marketing mix instruments

A non-parametric Mann-Whitney U test as depicted in Table 1 was applied to test whether the differences in the mean values for small manufacturers and small dealers on the degree of control over the marketing mix instruments was significant or not.

When the decision-rule that a pvalue ≤ 0.05 is an indication of a significant difference is applied, then all the p-values depicted in Table 1 are indicative that the majority of differences in mean scores between manufacturers and dealers on the degree of control over the various marketing mix instruments are not significant. The only significant difference between manufacturers and dealers is on product as a marketing mix instrument indicated by a p-value of 0.0104.

Table 1: Comparison of the degree of control over the marketing mix instruments between manufacturers and dealers

Marketing mix instruments	Mean		p-value
	Manufacturers	Dealers	
Product	4.76	4.16	0.0104
Price	4.38	4.01	0.1293
Place	3.80	4.22	0.2921
Promotion	3.90	4.14	0.3189
People	4.33	4.28	0.8827
Processes	4.19	4.01	0.3173
Physical evidence	3.71	3.97	0.3671

Likelihood of continuing with the use of the PLC in future for general management and marketing decision-making

A Wilcoxon *t* test statistic as depicted in Table 2 was applied to determine whether the differences on the mean values on the likelihood of the future use of the PLC concept between small manufacturers and small dealers were significant or not.

Table 2: Likelihood of continuing with the use of the PLC in future for general management and marketing decision-making per organisational type

Likelihood of using the PLC for ...	Organisational type						p-value
	Manufacturers			Dealers			
	N	Mean	Standard deviation	N	Mean	Standard deviation	
General management decision-making	21	3.85	0.96	21	3.95	0.86	0.5271
Marketing decision-making	71	3.80	0.96	71	3.91	0.90	0.1167

The decision-rule of a $p\text{-value} \leq 0.05$ was applied for significant testing and the $p\text{-values}$ of 0.5271 and 0.1167 depicted in Table 2 demonstrate that the differences in the mean scores between manufacturers and dealers on the likelihood of the continued use of the PLC for general management purposes and marketing decision-making purposes in future are not significant.

Group differences on the application of the PLC concept

- Small manufacturers regarded manufacturing and product development as more important than small dealers.
- There are significant differences between small manufacturing organisations and small dealer organisations when applying the PLC concept. Small dealers regarded buying, pricing and advertising as more important than small manufacturers.
- There are no significant differences between small manufacturing organisations and small dealer organisations when applying the PLC concept in the execution of distribution, forecasting, costing, monitoring market share, competitive evaluation and allocation of resources, although these aspects are important.
- There is no difference between small manufacturing and small dealer organisations in Gauteng in the extent to which the PLC influences marketing strategy and development.

Importance of the marketing mix instruments

The importance linked to the marketing mix instruments is depicted in Table 3 below.

Table 3: Importance of marketing mix instruments

Marketing mix instrument	Mean	p-value
Product	3.96	0.010
Price	3.31	0.000
Place	3.25	0.004
Promotion	3.85	0.000
People	4.36	0.003
Processes	3.74	0.248
Physical evidence (aspects no 109 – 124)	4.07	0.212

It can be deduced from Table 3 that the sample regarded all the marketing mix instruments as important based on the above average mean scores. A Friedman's two ANOVA was employed and there are significant differences in the importance of product (0.010), price (0.000), place (0.004), promotion (0.000) and people (0.003), as the p-values are ≤ 0.05 . The differences in the mean values on processes (0.248) and physical evidence (0.212) are not significant as indicated by a p-value ≥ 0.05 .

This result can be indicative of the difference in importance of each marketing mix instrument in the different PLC phases. The main finding is that people are regarded as the most important marketing mix instrument followed by physical evidence, product, promotion, processes, price and place. Table 4 provides marketing mix related aspects based on the highest mean value per PLC phase as obtained from the marketing decision-makers in the sample.

The results depicted in Tables 3 and 4 are an indication that the current PLC life cycle strategy assumptions should be broadened to include strategies on the additional Ps – people, processes and physical evidence in each PLC phase (Herbst & Du Plessis 2003).

RESEARCH PROPOSITIONS

Before the support will be motivated it is important to realise that the substance of the support should be treated and viewed against the result that 68.47% of small manufacturing and dealer organisations indicated that they have a marketing function or department responsible for making marketing-related decisions.

Table 4: Importance of marketing mix related aspects

Marketing mix instrument	PLC phases			
	Introductory phase	Growth phase	Maturity phase	Decline phase
People	Incentives to personnel	Incentives to personnel	Incentives to personnel	Incentives to personnel
Processes	Policies and procedures	Complaints handling	Complaints handling	Toll free number
Physical evidence	Organisation's name and logo	Organisation's logo and name	Organisation's logo and name	Organisation's logo and name

Proposition 1

P1: Small manufacturing organisations and small dealer organisations in Gauteng, South Africa do not have a marketing function responsible for applying the PLC concept when marketing strategy is developed and marketing decisions are taken.

Proposition 1 was **not supported** after the collective viewing of the following results:

- Small manufacturing and dealer organisations in Gauteng, South Africa have, in sixty-eight percent (68%) of all cases, a marketing department or function responsible for marketing decision-making.
- The converse is that in thirty-two percent (32%) of the cases other functional departments or functions are responsible for making marketing decisions in manufacturing and dealer organisations in Gauteng, South Africa.

Proposition 2

P2: Marketing managers of small organisations in Gauteng, South Africa use the PLC concept to plan and manage their products strategically through the various phases of the PLC.

Proposition 2 was **supported** based on the collective viewing of the following major findings.

- More than three-quarters of small manufacturing organisations and small dealer organisations in Gauteng use the PLC phases when they engage in strategic marketing planning and development.
- Ninety two percent (92%) of small manufacturing and small dealer organisations in Gauteng indicated that the PLC influences marketing strategy and development from an average to an above average extent.
- Marketing decision-makers in manufacturing and dealer organisations indicated a high likelihood of continued use of the PLC in future for general management decision-making.
- The likelihood of continuing with the use of the PLC concept in future for general management decision-making purposes is equally high irrespective of the fact whether small manufacturing and small dealer organisations have a marketing department or not.

Proposition 3

P3: Small organisations in Gauteng apply and use the PLC concept for marketing decision-making purposes.

Proposition 3 was **supported** based on the holistic viewing of multiple major findings. The support from the empirical results on this proposition was viewed against the results of the 21 small manufacturing organisations in the sample on current and future use tested in this study.

Current use can be supported by:

Forty percent of small manufacturer organisations of the sample in Gauteng know of and apply the PLC concept as a decision-making instrument.

Future use can be supported by:

- Marketing decision-makers in small manufacturing organisations indicated a high likelihood of continued use of the PLC in future for marketing decision-making purposes.

- The likelihood of continuing with the use of the PLC concept in future for marketing decision-making is equally high, irrespective of whether small manufacturing organisations have a marketing department.

RECOMMENDATIONS FOR FUTURE RESEARCH

Recommendations for future research will be based on recommendations for empirical research and literature as discussed below.

Recommendations for future research on the application and use of the PLC concept (Herbst 2001)

- A comparative study among medium and large organisations in South Africa by using the same methodology and measurement instrument should be done to draw possible comparisons and to provide better clarity on the current debate on the practical application of the PLC concept.
- Research is needed to provide empirical evidence to contribute to the ongoing debate as to whether the current PLC concept theory is still sufficient to be used as a basis for marketing strategy.
- Research is needed to provide empirical evidence to determine whether the current PLC concept theory is applicable to, and sufficient for, the successful marketing of physical products and services.
- Empirical research is needed on the use and applicability of the PLC concept in *South Africa* concentrating on smaller organisations, due to the contribution of small organisations to the local economy expressed by their contribution to the gross domestic product (GDP).
- More empirical research on the PLC concept is necessary to enable small business people globally to use the PLC concept as a foundation and guideline to improve marketing decision-making.
- Further empirical research is needed to develop a separate PLC concept for services to be inclusive of the intangible nature linked to the marketing of services.
- A replication study should be conducted in other third world countries (SADC, Latin America, Eastern Europe) as well as in other first world countries.

Recommendations based on the literature review (Herbst, 2001)

The researcher formulated the following recommendations for possible future empirical research in reaction to current available literature of the application and use of the PLC concept:

- If the increase in the literature of four pages in Kotler's first edition (1967) to a full chapter in his millennium edition (2000) is indicative of the importance and relevance of the PLC literature, then empirical research is needed to analyse the current PLC concept theory critically.

- The current PLC concept literature in marketing textbooks needs to be revised to include more empirical proof of the strategic value of the PLC concept to students, entrepreneurs and practitioners.
- The current literature on the marketing strategies in the PLC phases needs to be revised to be inclusive of the intangible nature of the marketing of a service.
- More literature is needed on the application of the PLC concept by marketing decision-makers in small organisations globally, and in South Africa specifically.
- More literature is needed on the impact of the service component on the universal formulation of marketing objectives and marketing strategies by small organisations.
- The current PLC concept literature needs to be broadened to include the intangibility linked to the marketing of a physical product.
- The current PLC concept literature needs to be revised to include a separate PLC concept theory for services marketing.
- The current PLC concept theory should be revised to be more inclusive of the intangibility linked to services marketing.

CONCLUSION

Although the empirical results achieved by this study are only representative of the industries and the area in which it was conducted, the following main conclusions are drawn:

- The PLC concept theory has application potential as a strategic tool and there is a high likelihood for its use as a marketing decision-making instrument in future.
- Marketing decision-makers in small manufacturing organisations and small dealer organisations tended to display a marketing knowledge level that was not in total unison with the existing marketing theory.
- The current PLC concept theory needs to be broadened to include strategies on the expanded marketing mix.
- There were differences between small manufacturing organisations and small dealer organisations on marketing characteristics and marketing strategies in the different PLC phases.

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