

PRODUCT LIFE CYCLE THEORIES – IMPLICATIONS FOR MARKETING

Wojciech Kozłowski

Chair of Market Analysis and Marketing
University of Warmia and Mazury in Olsztyn

Key words: classical product life cycle, product evolution, international product life cycle, marketing.

A b s t r a c t

Paper presents review of chosen product life cycle theories that should be, in the assumption, treated as specific guide for marketing actions and tools. Levitt' classical theory of product life cycle was the starting point of consideration of nature product life, and it's implications for marketing. Presenting this theory, there was underline, presented in the marketing literature, common critics with reference to possibility of utilize theory in the real marketing world. In the view of this, there was presented also another conception of product life – Ensis, Garce and Prell (theory of extending product life cycle), Tellis and Crawford (En evolutionary approach to product growth theory) and Vernon's theory of international product life cycle.

TEORIE ŻYCIA PRODUKTU – IMPLIKACJE DLA MARKETINGU

Wojciech Kozłowski

Katedra Analizy Rynku i Marketingu
Uniwersytet Warmińsko-Mazurski w Olsztynie

Słowa kluczowe: klasyczny cykl życia produktu, ewolucja produktu, międzynarodowy cykl życia produktu, marketing.

A b s t r a k t

Opracowanie stanowi przegląd wybranych teorii cyklu „życia produktu”, w założeniu mających stanowić rekomendacje odnośnie wyboru działań i instrumentów marketingowych. Punktem wyjścia rozważań nad naturą życia produktów i wynikającą z tego implikacji dla marketingu była klasyczna teoria „cyklu życia produktu” Levitta. Przedstawiając tę teorię, uwypuklono wyrażaną na łamach literatury marketingowej powszechną krytykę w odniesieniu do możliwości jej wykorzystywania w praktyce. W tym świetle przedstawiono inne koncepcje „życia produktu” – Enisa, Garce'a i Prella (teorię ponownego życia produktu), Tellisa i Crawforda (teorię cyklu ewolucji produktu) oraz Vernona (teorię międzynarodowego życia produktu).

Introduction

The first product life cycle theory defining the regularities in the development of products' sales and profits over time was elaborated during the sixties of the past century. According to that cycle that was based on the analogy to the biological nature of higher order organisms' life the individual goes through a series of fixed and identifiable stages starting with birth through growth, maturity, decrepitude and finally its death. Although the studies on the product life cycle were initiated by Dean during the early 1950s the further works, in particular the innovation spread model by Roger of 1962 (KOZŁOWSKI, MICHALAK 2010) and the 4-stage product life cycle model presented three years later by LEVITT (1965) provided the impulse for the discussions on the product life cycle and its application in marketing.

The attempts on empirical verification of the paradigm by Levitt undertaken indicate the existing problems related to practical application of the model as a strategic marketing management tool. That is why consecutive researchers of "product life" developed alternative marketing theories explaining that phenomenon on one hand while on the other they took efforts at applying the "cycle" not only in managing the product of the company but also, among others, strategic planning in retail trade, explaining the functioning of foreign trade and as a tool for linking production with marketing and for forecasting the sales (KOBA 2006a). This paper represents an attempt at presenting more closely the selected marketing concepts concerning the "product life" while drawing particular attention to their suitability for formulating a marketing strategy. In that context the classical product life cycle theory as well as the theory of extending the product life cycle, the evolutionary approach to product growth theory and the theory of international product life cycle were presented.

Classical product life cycle theory by Levitt

As Theodor Levitt stated rightly, the success of every product in the market depended on the length of its life cycle and the total volume of its sales from the moment of its appearance in the market until the moment of its withdrawal. According to the classical life cycle theory the majority of successful products represent the history of their sequential transition through the identifiable stages assuming the form of the "S-shaped curve of sales/profit" that appear according to the following, sequential order: market development, market growth, market maturity and market decline (Fig. 1). Each of those stages represents not only a different level of sales and profits generated, different

marketing costs, different characteristics of clients and competition as well as different market goals of the company but also the need for diversifying the marketing activities of the company concerning the same product, its price, distribution and promotion resulting from those characteristics¹.

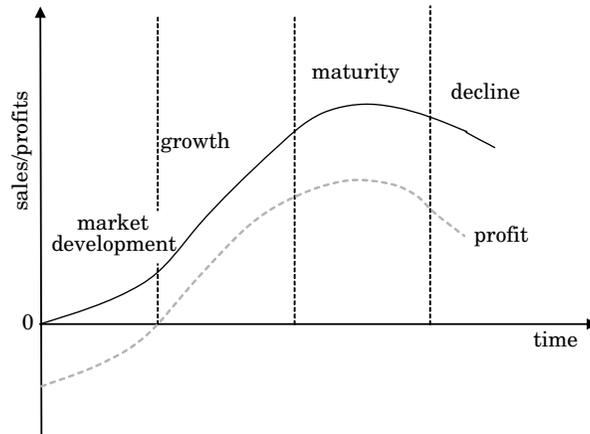


Fig. 1. Classical product life cycle

Source: own work based on: LEVITT (1965).

The concept of biological product life cycle, because of its simplicity and assumptions made, is highly controversial. It raises numerous controversies among both the theoreticians and the practitioners as a consequence of the limitations existing in its application in product marketing management practice. One of the fundamental objections against that model is that actually we may deal with different numbers of stages in the product life cycle and with different durations of the individual stages, and as a consequence, different shapes of the curve diverging from the S-shape (Fig. 2). That is why formulation of straight conclusions concerning the choice of marketing strategies for each of the stages in the market life of the product is not justified fully. In the subject literature other objections against the rightness and usefulness of the concept by Levitt are formulated (Tab. 1). Currently, the majority of practitioners and theoreticians realize that the development of the product life cycle is a dynamic process where the individual stages imply appropriate marketing strategies on one hand, while on the other the strategies applied influence the sequence and duration of those stages.

¹ The marketing strategies for every stage of the market life of product are presented exhaustively in every marketing course book. The books by MRUK and RUTKOWSKI (1994) as well as GARBARSKI et al. (1998) deserve recommendation in that aspect.

Table 1
Sample problems related to application of the classical product life cycle concept

Model assumption	Model application limitations	Author (publication year)
The model represents an analogy to the biological life cycle of the organism	<ul style="list-style-type: none"> - products are not organisms and have no natural development cycle - product life is more complex and is not so predictable and characteristic as the life of a natural being 	ENIS, GARCE, PRELL (1977), TELLIS, CRAWFORD (1981), MASSEY (1999)
The model applies to the class, form and brand of product	<ul style="list-style-type: none"> - opinions concerning the model usefulness for analysis of life or product classes and forms are diversified - the theory reflects a little or does not reflect at all the life cycle of product brands - their life cycle is more stable, much longer than provided according to the classical model 	POJLI, COOK (1969), DHALLA, YUSPEH (1976), MERCER (1993), TELLIS, CRAWFORD (1981)
The sequence of cycle stages is determined in advance	<ul style="list-style-type: none"> - determination of the actual stage and forecasted future levels of sales becomes ambiguous - the duration of each stage may be different in case of different products, products may go through the cycle in different sequences and for different times 	DHALLA, YUSPEH (1976), O'SULIVAN (1977), SWAN, RINK (1982), KOTLER (1988), GOLDER, TELLIS (2004)
The model assumes inevitable and natural death of the product	<ul style="list-style-type: none"> - the danger of self-fulfilling prophecy of product death appears because managers do not take any actions - when the product is in the last stage of its life this does not mean that the product must die; only unsuccessful or poorly managed products are condemned to death 	DHALA YUSPEH (1976), ENIS (1977), SMITH (1980), WOOD (1990)
The stages are determined by the level and dynamics of sales and profit	<ul style="list-style-type: none"> - there are no clear and generally accepted criteria defining the beginning and the end of a stage in product life - identification of boundaries between stages depends on different life cycle patterns, as a consequence, the more variations of the classical model exist the more difficult the positioning of the product on the curve becomes 	TELLIS, CRAWFORD (1981), DAY (1981), WOOD (1990)
The product life curve is independent and company actions have no influence on it	<ul style="list-style-type: none"> - the product life cycle development is a dependent variable conditioned by marketing activities - actions taken by managers may actually determine the shape and development of the curve over time - the time and development of product life are determined by the strategy applied and not the other way round 	DHALLA, YUSPEH (1976), HARRIGAN (1980), TELLIS, CRAWFORD (1981), WOOD (1990)
The model recommends the sequential strategies for product life cycle stages	<ul style="list-style-type: none"> - the strategies in the model are very general and simplified, there is no unique strategy for every stage, different action strategies may be applied for the individual stage, - the product life cycle does not happen but it is rather the result of various factors that should be considered by those planning the marketing - marketing strategies depend not only on the stage and shape of the product life cycle but also the objectives of the company, nature of the market environment and business characteristics - the model dismisses those more important than sales that are to a certain degree more controllable by the managers 	SWAN, RING (1982), THIETARTA, VIVASA (1984), DHALA YUSPEH (1976), HARRIGAN (1980), ENIS (1977), THORELLI, BURNETT (1981), GALBRAITH, SCHENDEL (1982), WOOD (1990)

Source: own work based on: DHALLA, YUSPEH (1976), LAMBKIN, DAY (1989), MERCER (1993), RYAN, RIGGS (1996), WOOD (1999), GOLDER, TELLIS (2004), KORA (2006b).

Theory of the extended product life cycle by Enis, Garce and Prell

As different from the “classical product life cycle theory” the “extended product life cycle theory” is based on the assumption that products are not like organisms and that they have no natural development cycle and that the product life cycle is not a function of time. This means that the shape of the sales curve and the time of product existence in the market are influenced directly by the strategic decisions taken by the company as concerns the given product. According to the proposed model ENIS et al. (1977) point out that it is the company that decides whether the product that was developed earlier is to enter the market, what level of sales is optimal, what forms the product is to assume and whether it is to be withdrawn from the market or to continue its life. In the theory of the extended product life cycle the product passes through the 5 stages identified below (Fig. 3), that are characterized by the specific cost to profit relations.

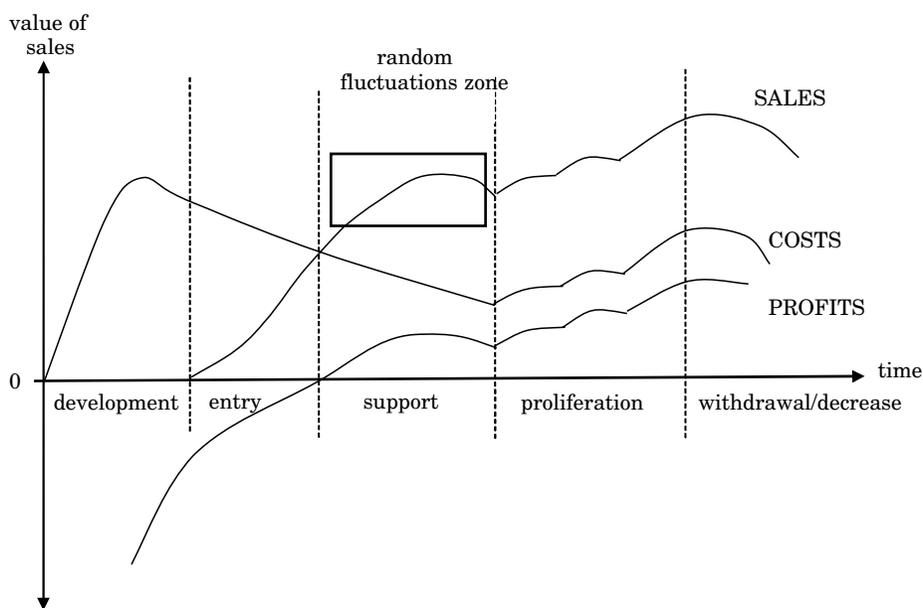


Fig. 3. Sales, costs and profits in the extended product life cycle

Source: ENIS, GARCE, PRELL (1977).

1. Development – this is the cost-intensive period of preparation of the product for floating to the market. Four types of new products may result from works on development of a new product: the product that incorporates a new

concept (a completely new way of satisfying the client needs), it may represent a new process (substitutes for an existing method of satisfying the specific desires of the client), it may be new for the company although similar products may already be available in the market or it can be a new model or improved version of the existing products.

2. Entry – the type of a new product is floated to the market with significant marketing support. At that stage, achievement of the predetermined level of sales or market share is the objective of the marketing strategy. At the entry stage the costs start decreasing although they remain significantly higher than revenues.

3. Support – the aim of the marketing activities at that stage of the product life is to maintain sales of the basic product at the predetermined and stable level although the sales may fluctuate (within the range of the so-called random fluctuations). Maintaining the product sales growth dynamics is becoming increasingly impossible because the competitors enter the market with similar products and the product loses the characteristics of a novelty. At that stage the break-even point is achieved – the product starts generating profits, the costs should reach a low level and the profits generated should allow recovery of financial outlays incurred in the new product development process.

4. Proliferation – this is the product diversification stage during which the managers alter the product offered in various ways to differentiate it from the competitors (numerous variants of the product appear differing in, e.g. packaging, price or attributes). The aim of that stage is to improve the degree of product adaptation to market segments that have not acquired the basic product yet. Taking the decision concerning diversification is, obviously, linked to the expectations of increasing the product sales. The marketing costs related to product diversification (promotion, product innovations) as well as profits increase during that stage.

5. Withdrawal/decline – at that final stage of product life the managers have two options. First, the product may be withdrawn from the market and substituted by a new, improved version of the dying product. Second, the product may be allowed to die its own death. In this case the brand is retained in the market without marketing support as long as the product sells. The decrease in sales results in a dynamic decrease of costs and gradual decrease in profits.

The presented concept provides a much better framework for development of the marketing strategy than the classical theory. The supremacy of that theory results from the fact that the manager that knows for how long he would like to keep the product in the market may plan the duration of each stage by modification of one of the variables (costs/profits). According to this

approach, in case of each stage in product life the product price level can be modified to obtain the appropriate cost to profit relation. Which is more, the duration of every stage, the appearing costs and revenues, depend heavily on the activities undertaken in product marketing in relation to the internal (production, finance, personnel) and external (competition, government regulations, client perception) conditions.

Theory of the “product evolution cycle” by Tellis and Crawford

The “product evolution” model, referring, similarly to the model by Levitt to the nature of biological development of organisms formulated by Darwin, represents a different concept of “life” of the product. TELLIS and CRAWFORD (1981), conducting the review of the scientific materials on empirical confirmation of the classical product life cycle prove that many products do not pass through the foreseeable pattern of sales development assumed by Levitt. Which is more, they indicate that the majority of products change during their lifetime – the product evolves towards the forms that are more complex and better adjusted to the client demands. In that context Tellis and Crawford formulate the conclusion that instead of depending on the rigid and deterministic analogy to the biological life cycle according to which the organisms pass through the inevitable cycle from birth to death we should look at the product life more in the categories of the evolutionary process. As a consequence, like the biological evolution theory, it assumes gradual and continual change of the product at five characteristic levels of evolution:

- product is not an individuality in itself because it stems from the line of its predecessors, the changes taking place during product evolution are cumulated because every new version of the product is based in the earlier model and is a better version of it (the changes are cumulated);
- product evolution is perceived from the perspective of the consecutive, sequential changes in product characteristics; as a consequence we deal with the new or improved products (better usable for the buyers) in the market that substitute for the earlier models offered in the market and cause that the offer of products is much more diversified allowing more choice options for the clients within a given group of products (the changes are directional);
- product evolution occurs as a consequence of three interrelated and unique forces motivating the product change process over time, i.e. creativity of the managers, consumer behaviors and competitor behaviors; those forces influence the decisions on which products stay in the market and which products will have to vanish from the market (the changes are motivated);

– the product life curve shape is not predetermined as its shape and length are highly dependent on the external environment, i.e. the influence of the three forces and the strategy assumed by the company (the changes are model changes).

The character of those changes causes that the product passes through five patterns of the evolution process. Each of the following patterns actually has undetermined length, it can follow or precede other patterns and it is dependent not so much on the preceding pattern but on the ability of meeting the market challenges:

- divergence – represents introducing product of a new type to the market,
- development – represents rapid growth in sales of the new product; the product is gradually adjusted to the consumers to meet their needs the best,
- differentiation – appears when a highly successful basic product is diversified to adjust it to different interests of the consumers,
- stabilization – represents the model of stable or fluctuating sales characterized by several major changes in the product category,
- demise – appears when the product is unable to meet the client expectations or is unable to satisfy the changes in consumer demand any longer.

The evolution theory by Tellis and Crawford was subjected to critique by, among others, MASSEY (1999). He states, among others, that as the application of the Darwin model to product development description and its evolution and lasting in the market requires acceptance of the fact that product versions are accidental and entirely independent of the market needs it is contrary to the product development reality and its later economic results achieved in the market.

Theory of the international product life cycle by Vernon

From the perspective of the current dynamic development of international business and marketing the classical analysis of local marketing activities for specific markets in the context of product life cycle should be enriched with the analysis of regularities concerning the international product life cycle. This could be useful for analysis and choice of the international marketing strategies. That is why it is also justified to present the classical theory by VERNON (1966) stemming from the neo technological approach to foreign trade. That pioneer theory has become the inspiration for creating the consecutive international product life cycle concept and its use by the international business. It describes the process of proliferation of innovation across state borders explaining why the countries initially exporting a specific product ultimately become the importers of that product (Fig. 4). Vernon identifies three product development stages (VERNON 1966, DULINIEC 2009, RYMARCZYK 2004):

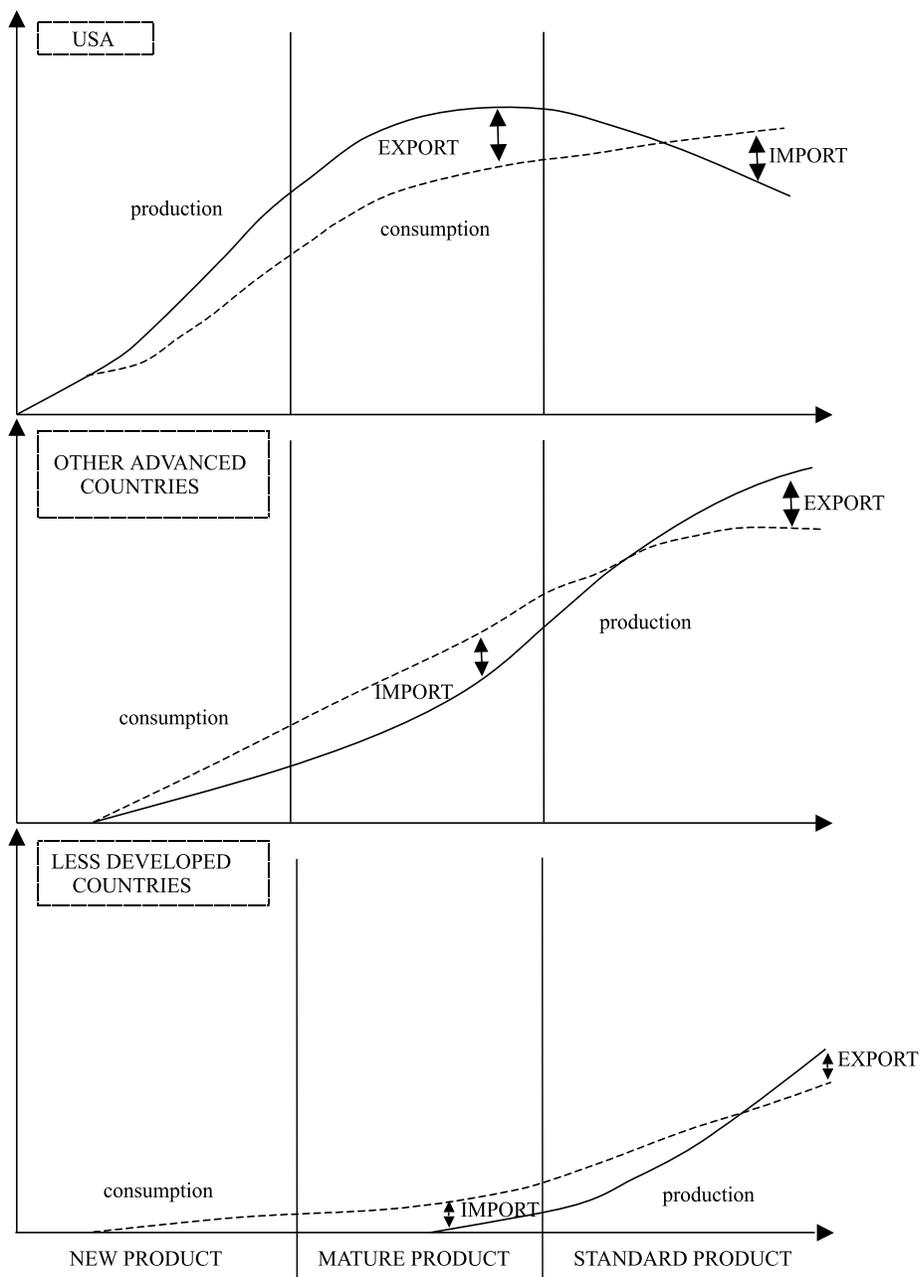


Fig. 4. International product life cycle

Source: own work based on VERNON (1966).

1. New product (stage 1). During the first stage production of a new product is initiated in reaction to the needs of the client in the country of origin², where supportive production and market conditions exist. After some time, i.e. when the supply of the product has sufficiently satisfied the domestic consumption, the surplus of the product is exported to the markets of other advanced countries where the demand increases.

2. Product maturity (stage 2). During the second stage of the product life cycle export becomes an important aspect of the company innovation strategy. In this case the export covers highly developed countries that are not the innovators. After a period of increasing imports production of the earlier imported product starts in the importer country³. The production technology is already more mature and developed, production is cheaper and no labor possessing particularly high qualifications is necessary. Those countries decrease the imports of that product and start exporting it to the markets of poorer developed countries.

3. Standard product (stage 3). This stage presents the situation in the poorer developed countries initially participating in the international trade as importers. At the stage of product standardization the company transfers production to low cost (of labor, raw materials, energy) countries to control the costs⁴. Production in those countries is only partially focused on satisfying the local market needs because, as it is impossible to achieve the economy of scale there, a significant part of production is exported. Within the longer time perspective, with standardization of the product, the innovation country and the countries of the second group become net importers of the product as for the cost reasons production in those countries decreases as a consequence of moving production to other countries. In case of standardized products poorly developed countries can achieve comparative competitive advantage resulting from production location. As a consequence, advanced countries import products from their former clients because that is cheaper than continuation of production in their own markets.

Although the theory by Vernon is commonly presented in course books on internationalization, it is currently questioned for a number of reasons of key importance. First, it is losing its validity increasingly as a consequence of emergence of the Triad, BRIC⁵, globalization and dynamic development of

² i.e. a highly developed country with technology innovation available.

³ This may result from the company marketing strategy in the country of the innovative solution related to the choice of the foreign markets entry strategy: sale of the license, contracted production or construction of an own production facility.

⁴ This may lead to contract production in such countries, establishment of companies or own production branches.

⁵ BRIC – Brazil, Russia, India, China – countries forming the counterweight for the countries forming the Triad.

China. Second, the United States is not the only country in the world in which the product ideas are born currently. New products are born everywhere where the activities of companies in the field of research and development of product are subject to globalization. Third, at present companies create new products and introduce product modification within a very short time and in numerous markets simultaneously to recover the costs involved in research and development⁶. Fourth, An increasing number of companies operate in the international markets from their very establishment⁷. Internet caused that this is much easier, particularly for small and medium companies (HOLLENSSEN 2004). Despite those limitations, nevertheless, the theory by Vernon may provide the companies with knowledge useful in the process of company internationalization, particularly as concerns transfer of production to foreign markets that in a longer perspective and with the technology maturing substitutes for exports (DULINIEC 2004).

Conclusion

The classical product life cycle model by Levitt is one of the most frequently quoted and taught elements of marketing theory. Nevertheless, considering its significant imperfections indicated in this paper it is losing its usefulness for business practitioners. That is why more pronounced exposition of other, more useful for marketing managers, alternative models explaining the relations existing between the product life cycle stages and choice of marketing activities and instruments in marketing literature is becoming increasingly justified.

None of the theoretical models presented is ideal and can be employed to provide simple solutions for marketing problems that are complex by nature. They rather create the frameworks for development of marketing strategies. Managers responsible for managing sales of product brands should be aware that the stage of life in which the product is represents just one of the criteria for choice of marketing activities and instruments. The choice of the marketing strategy is also determined by the objectives that the company intends attaining, tangible and intangible resources available to the company as well as widely understood micro and macro business environment. In this context the product evolution cycle concept represents a valuable and deserving attention model reflecting the current reality of product life. The superiority of the concept by Tellis and Crawford as compared to other concept is determined by

⁶ In the subject literature such a strategy is commonly referred to as the shower strategy.

⁷ Those are companies referred to as born globalists.

the fact, among others, that through application of appropriate marketing strategy the company can influence directly the lifespan of the product in the market and the development of its sales within the determined market environment.

Translated by JERZY GOZDEK

Accepted for print 2.09.2011

References

- COX W.E. 1967. *Product life cycle as marketing models*. Journal of Business, 40(4): 375–384.
- DHALLA N.K., YUSPEH S. 1976. *Forget the product life cycle concept*. Harvard Business Review, January-February, pp. 102–110.
- DULINIEC E. 2004. *Marketing międzynarodowy*. PWE, Warszawa, p. 208–216.
- ENIS B.M., GARCE R. LA, PRELL A.E. 1977. *Extending product life cycle*. Business Horizons, 30(3): 46–56.
- GARBARSKI L., RUTKOWSKI I., WRZOSEK W. 1998. *Marketing – punkt zwrotny nowoczesnej firmy*. PWE, Warszawa, pp. 254–257, 261–265.
- GOLDER P.N., TELLIS G.J. 2004. *Growing, Growing, Gone: Cascades, diffusion, turning points in the product life cycle*. Marketing Science, 23(2): 207–218.
- HOLLENSSEN 2004. *Global Marketing. A decision-oriented approach*. Prentice Hall, pp. 472–475.
- KLUYVER C.A. 1977. *Innovation and industrial product life cycles*. California Management Review, 20(1): 21–33.
- KOBA L. 2006a. *Teoria cyklu życia produktu – impuls dla nowych koncepcji*. Marketing i Rynek, 10: 8–13.
- KOBA L. 2006b. *Teoria cyklu życia produktu – prawda czy fałsz*. Marketing i Rynek, 6: 15–21.
- KOZŁOWSKI W., MICHALAK J. 2010. *Proces dyfuzji nowych produktów – model Rogera i model Bassa*. W: *Marketing w realiach współczesnego rynku. Strategie i działania marketingowe*. Ed. Sz. Figiel. PWE, Warszawa, pp. 57–67.
- LAMBKIN M., DAY G.S. 1989. *Evolutionary process in competitive market: Beyond the product life cycle*. Journal of Marketing, 53 (July): 4–20.
- LEVITT T. 1965. *Exploit the product life cycle*. Harvard Business Review, 43 (November-December): 81–94.
- MASSEY G.R. 1999. *Product evolution: a Darwinian or Lamarckian phenomenon*. Journal of Product & Brand Management, 8(4): 301–318.
- MEENAGHAN J., O'SULLIVAN J. 1986. *The shape and length of the product life cycle*. Irish Marketing Review, I (Spring): 83–102.
- MERCER D. 1993. *A two-decade test of product life cycle theory*. British Journal of Management, 4: 269–274.
- MRUK H., RUTKOWSKI P.J. 1994. *Strategia produktu*. PWE, Warszawa, pp. 106–121.
- RYAN CH., RIGGS E.W. 1996. *Redefining the product life cycle: the five-element product wave*. Business Horizons, September-October, pp. 33–40.
- RYMARCZYK J. 2004. *Internacjonalizacja i globalizacja przedsiębiorstwa*. PWE, Warszawa, pp. 43–45.
- SWAN J.E., RINK D.R. 1982. *Fitting market strategy to varying product life cycle*. Business Horizons, January-February, pp. 72–76.
- TELLIS G.J., CRAWFORD M.C. 1989. *An evolutionary approach to product growth theory*. Journal of Marketing, 45 (Fall): 125–132.
- VERNON R. 1966. *International investment and international trade in product cycle*. Quarterly Journal of Economics, 80 (May): 190–207.
- WOOD L. 1999. *The end of product life cycle? Education says goodbye to an old friend*. Journal of Marketing Management, 6(2): 145–155.

