Product Life Cycle (PLC) Analysis

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Product life cycle (PLC) analysis is a simple yet powerful analytical tool that can help managers identify appropriate strategies and tactics to improve product sales and profit performance. The PLC approach may be applied to a product category or a product brand.

When product category sales are tracked over time, initial demand is nonexistent, then increases, stabilizes, and finally diminishes (see Figure 1). Every product has or goes through time-bound stages of a cycle (Vernon, 1966). Generally, the PLC has four stages: introduction, growth, maturity, and decline (see Figure 2). The time horizon may be decades long, as in the case of the automobile; or, it may be as short as a few months in the case of a fad; for example, the famous Pet Rock fad of 1975 lasted less than six months (Fox, 2015). Many product categories are now in fast-cycle markets where rapidly changing technology and reverse engineering erode any first-mover advantage and create imitators quite quickly. Regardless, in each case, four distinct stages can be identified.

In the **introduction** stage there is a perceived need in the market that a firm or an entrepreneur seeks to fill. They go through a product development phase before a product is introduced in the market: product ideas are generated, prototyped, and

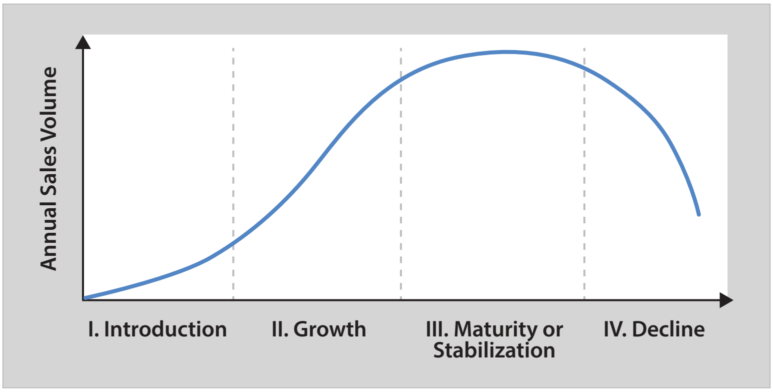

Figure 1. Product Life Cycle. Malakooti, B. (2013). Operations and Production Systems with Multiple Objectives.

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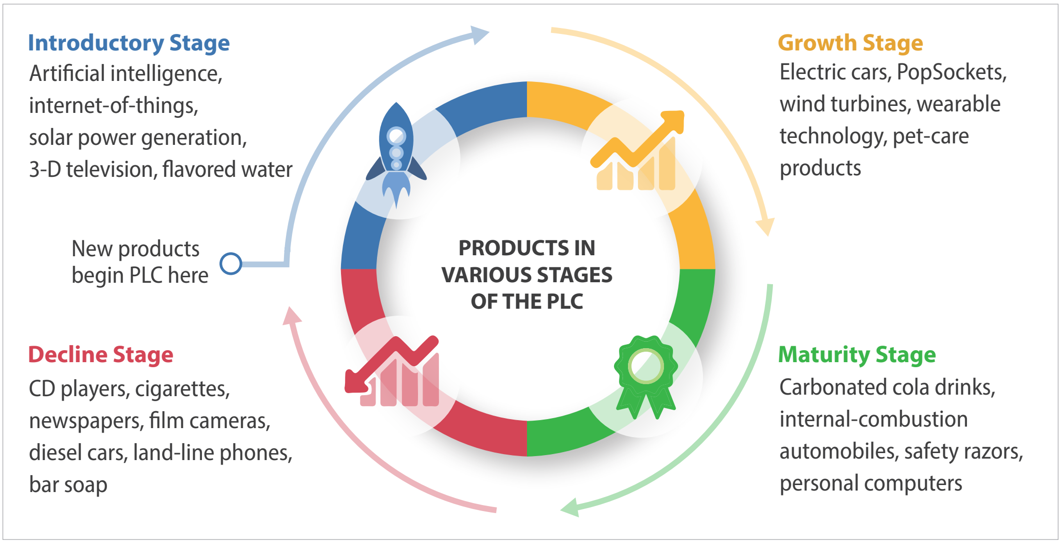

Figure 2. Never-Ending Cycle.

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tested. Many new products that do get introduced never get past the initial stage because of a lack of sufficient sales (Castellion & Markham, 2013). So, when a new product is launched, a firm has to ensure that all the attendant requirements of financing, manufacturing, promoting, and distributing it are addressed.

If a firm's product does get traction in the market, typically the myriad costs outpace revenues, and the primary question for the firm is how long it can sustain losses. Pricing strategy creates a dilemma: a high price may shorten the payback period, but it may discourage consumers from buying (or trying) the product; on the other hand, a low introductory price, while encouraging sales, may barely cover the direct cost of the item. Historically, as examples, Apple successfully followed a high-price strategy for its iPhone; Henry Ford went with the low-price strategy when he introduced the Model T in 1908. Other elements of marketing strategy are built around creating consumer awareness and educating the consumer on the benefits and uses of the product. Meanwhile, manufacturing strategy is focused on sourcing raw materials, building production capacity, and improving production efficiency. Financial strategy is a juggling act trying to spread insufficient cash flow judiciously to keep all the cost centers mollified.

The transition from the introduction stage to the **growth** stage marks a critical point where potential increases in demand become evident. However, that increase in demand also brings competitors to the marketplace. Nevertheless, a firm that has first-mover advantage can charge a higher price than its competitors can, at least for a while. However, as more competitors enter the industry, prices tend to come down. The marketing focus shifts to building brand awareness and keeping competitors at bay. In this stage, it is easier to find a new customer than to take the customer away from a competitor. Manufacturing capacity needs to expand in order to meet demand as well as to take advantage of economies of scale to bring per-unit costs down. Financial strategy may require buttressing cash flow with selling share or taking loans.

As the product enters the **maturity** stage, sales growth slows down, and competition becomes cutthroat. At the middle-to-late portion of this stage, the number of competitors decreases as low market share firms drop out or are acquired; the industry begins to take on the features of an oligopoly. Industry leaders in this stage have the advantage of brand awareness, brand recognition, brand loyalty, and high market share. A combination of those factors allows them to charge a high price for the product. Their per-unit costs are lower than the industry average, because they have better economies of scale due to high production volume. Hence, their profit margin is higher and relatively stable. An industry pecking order is established. Companies with these characteristics are appropriately called “cash cows.” Marketing strategy is designed to protect market share and attempts to enhance it by taking customers away from competitors. Manufacturing strategy is dedicated to improving productivity and efficiency. Financial strategy shifts to the deployment of excess cash flow to the development (or acquisition) of products in the introductory or growth stages of a new or separate PLC.

New technology may make existing products obsolete and can create a new PLC. The **decline** stage is marked by decreasing demand, possibly caused by changing consumer preferences and/or advent of substitute products with better price/performance ratios. There is also a further exodus of marginally performing firms. Firms that stay try to stem or slow the decline by a combination of strategies and tactics, including judicious price discounting, closing/selling inefficient manufacturing operations, financial divestment of underperforming assets, or marketing new uses of the product.

It is important to note that the decline of an industry in one country may lead to growth in another country. Until the end of World War II, industries in many countries were insulated from external competition due to geography, stage of economic development, sources of raw materials, trade restrictions, and/or governmental policies. However, the rise of globalization, technological innovation worldwide, lower barriers to international trade, lower labor costs elsewhere, and lower transportation logistics costs have created a global marketplace for some products and new opportunities for “old” products in emerging countries. A case in point is the beginning decline of the personal computer in the West and a growth surge in Asia and Africa.

Hence, PLC analysis has to be applied prudently: consideration needs to be given to the level of analysis, whether product category level or brand level or limited to a particular geographical area.

See Table 1 for examples of products in various stages of the PLC.

Introductory Stage	Growth Stage	Mature Stage	Decline Stage
Apple successfully followed a high-price strategy for its iPhone; Henry Ford went with the low-price strategy when he introduced the Model T in 1908.	In the 1970s video recording industry, VHS won out over Betamax even though Betamax was first to market.	The personal computer industry is showing signs of entering the decline stage.	Products that have gone through all the stages of PLC are stagecoaches, typewriters, and video rental stores.

Table 1. Examples of Products in PLC Stages.

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