

Product Identity Over Time and the Concept of Product Life Cycle

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Received: March 30, 2018

Accepted: April 13, 2018

Online Published: April 25, 2018

doi:10.5430/jms.v9n2p27

URL: <https://doi.org/10.5430/jms.v9n2p27>

Abstract

Since the introduction of the concept of the product life cycle (PLC) to the marketing literature almost 67 years ago, a plethora of literature regarding this concept has appeared in the academic as well as trade journals. In spite of an extensive body of research related to PLC, several critical questions related to the product identity and changes in the identity of product over time are completely ignored by the researchers. This study is an attempt to fill this gap in the marketing literature. After defining the concept of product identity, we provide answers to the following questions: How do products stay the same even after they change? At what point does a product become different? When we talk about a certain product and say that “it changed,” what exactly is “it”?

Keywords: product life cycle, product identity, ship of Theseus Paradox

1. Introduction

Since the introduction of the concept of product life cycle (PLC) almost seven decades ago (Dean, 1950, 1951), a plethora of literature has appeared in the academic as well as trade journals and marketing text-books. The enduring appeal of the PLC may be attributed to its intuitive logic akin to biological analogy of living organisms going through a sequence from birth to growth to maturity to decline. The rationale for product life cycle is attributed to the theory of diffusion and adoption of innovations. During a product's PLC introductory stage, the number of total buying population is limited. As the product becomes better known, the number of buyers (adopters) increases during the PLC growth stage until the number of adopters reaches its maximum signaling entry into the product's maturity stage. Subsequently, when the rate of adoption begins to decline the product has entered its decline stage.

In the past seven decades, very little progress has been made in “straightening the wrinkles” of the concept. The statement made by Levitt in 1965 is also true today. “The concept of the product life cycle is today about the stage that the Copernican view of the universe was 300 years ago; a lot of people knew about it, but hardly anybody seemed to use it in any effective or productive way (Levitt, 1965).

The main problem with the PLC concept is that many products do not behave in a predictive way as living organisms. Some products skip some stages, others such as Nylon may linger in a stage or two. The observed different patterns of PLC have raised questions related to the value of the concept both as a predictive model for identifying inflection points of PLC curve and as a prescriptive model for strategy planning for each stage of the concept. It is also charged that the concept is not an independent, predictor variable. Rather, the PLC patterns are the result or output dependent on marketing strategies (Dhalla and Yuspeh, 1976, p.105).

Research related to the PLC can be categorized into the following 9 groups:

1. Does sales history of products have a recognizable PLC patterns?
2. What is the length of each stage?
3. What are the underlying forces/factors that determine the parameters of the life cycle?
4. What is the potential for forecasting the key parameters of the life cycle?
5. What is the appropriate level of product aggregation: generic, class, form, or brand?
6. What are the appropriate levels of measurement (treating continuous variables such as price as ordinal or nominal variables)?
7. Is it possible to forecast inflection points of PLC curve?

8. Is PLC a useful concept for strategy planning and to what extent it is used by business organizations?

9. Can the present life cycle position be unambiguously identified?

Surprisingly, the critical question related to PLC, that is, product identity and a change in the identity of product over time are almost completely ignored by the researchers.

This research is an attempt to make a contribution to this neglected area of PLC research.

1.1 Purpose

The main purpose of this study is to address the question regarding when a “product identity” changes within the PLC sales curve and how the PLC curve should be considered. There are many dimensions along which a product identity can change. Given a change, is it appropriate to conceptualize a singular PLC over time that ignores product changes over its life span? Or is it more appropriate to treat each significant product change as having changed product identity enough to warrant considering a distinctive and separate PLC trend for each? The concept of identity and identity over time creates a great deal of philosophical complexities. These complexities usually are discussed in the form of paradoxes. We will briefly discuss the Ship of Theseus paradox and suggest methods for solving the paradox of PLC.

In the following sections, first we will introduce the concept of identity and make a distinction between qualitative identity and numerical identity. Second, we discuss the concept of change over time. Third we offer several solutions for the paradox of change overtime. Marketing implications of these solutions will follow the solutions of the change overtime. Finally, a conclusion concerning the usefulness of the concept of PLC will be offered.

1.2 The Concept of Identity

When objects are called identical, it is meant they are the same. “Identity” and “sameness” mean the same. According to Zalabardo (2000) identity is a relation each thing bears to itself and to no other thing. This definition of identity is both circular “no other thing” and paradoxical. It is circular because two objects can be *the same* in one sense such as cars (four door sedan and hatchbacks), or computers (laptop and desktop) and hence absolutely identical. On the other hand, the same objects can be said they are absolutely different cars or computers if the reference is to the properties of the objects such as shapes or colors.

The confusion surrounding the definition of the term “identity” comes from the vagueness of the term “same”. The term is used for two different forms of identity, i.e., “qualitative identity” and “numerical identity”. Objects are said to be qualitatively identical if they share certain properties. Therefore, objects can be more or less qualitatively identical. A desk top computer and laptop computer are qualitatively identical because they share the property of being a computer. Numerical identity requires total qualitative identity and can only hold between a thing and itself (Stanford encyclopedia of Philosophy, 2014a).

1.3 Changing Identity Over Time

An area of debate which dates back to the ancient world is the issue of *change* over time and identity. Objects change but remain the same. For example, the same computer has at one time internal disc drive and another time external drive. How can something be both identical and different from one time to another?

Aristotle’s solution to the above question was a distinction between “*accidental*” and “*essential*” changes. *Essential* properties of an object are the ones that an object must have. For example, engine of a car may be considered an essential property. On the other hand, accidental properties are the ones that an object happens to have but that it could lack. For example, properties such as the radio or heater of a car.

Unlike a change in essential properties of an object, accidental changes do not result in a change in the identity of the object. Obviously, this solution depends on a coherent distinction between accidental and essential changes, and between accidental and essential properties of the objects.

The above distinction is called into question by noting that two objects can have all their qualities in common at two-time periods without being numerically identical. It is also possible for two objects to be numerically identical without being qualitatively identical by having different qualities at different times (Stanford encyclopedia of Philosophy, 2016).

Akin to the notion of a change due to “*accidental*” and “*essential*” properties of an object is the distinction between intrinsic and extrinsic properties of an object. Intrinsic properties are things that are good in themselves, i.e., involve nothing other than the object and its parts at a given time. Extrinsic properties of an object are those that are good as a means to other things. Consider for example, a product like Coke. The chemical composition of Coke may be called the

intrinsic property of the product. However, when the same product is offered in a plastic package instead of glass, the resultant change is due to a change in its extrinsic properties.

A distinction between intrinsic and extrinsic properties has also been made by using “relational” for the opposite of intrinsic. According to Ellis (1991, section 3.4) we should distinguish between properties that objects have independently of any outside forces acting on them and those that they have in virtue of those outside forces. Using “relational” for the opposite of intrinsic, has its own limitations (engine of a car and coolant have relation to each other; however, they are intrinsic parts of the car’s engine).

2. Literature Review

Despite the fact that product identity plays a critical role in PLC concept, no explicit reference to this concept is found in the marketing literature. We may relate the concept of extrinsic and intrinsic properties of a product to Day’s discussion of multiple function material. Day identifies three scenarios: First is the multiple function material. The question is whether a product such as Nylon processed for different applications such as carpeting, tire cord, and hosiery, exhibit different life cycles. According to Day, the answer is in affirmative. We may infer that the intrinsic property of Nylon changes with different applications. The second scenario is the case of technology substitution process when neither the functions nor the customers of the product changes. For example, beverage cans being changed from three-piece steel/tin to aluminum. In scenario two, the product does not display a different life cycle, changes are related to extrinsic property of the beverage.

The last scenario is a sequentially unfolding of segments (life-cycle extension). According to Day, “Some life cycles are a composite of the sequential introduction and development of a basic function/technology within a series of related customer segments.” (Day, 1986) In this scenario the PLC goes through a cycle and recycle process pattern (Figure 1).

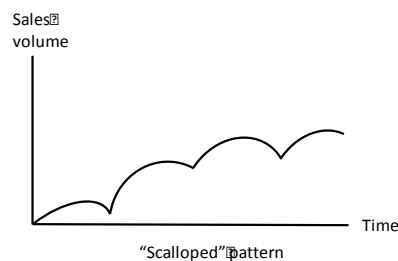


Figure 1

It is also possible to link the concepts of product identity and PLC to Robertson’s classification of innovations. Robertson classifies innovations into three groups: Continuous, dynamically continuous, and discontinuous innovations. Robertson’s classification is based on the disrupting effects of an innovation on the consumers’ established consumption patterns. The literature is not clear about the *degree* of the separation among the three innovation classifications. Continuous innovations are cited to have “the least”, and dynamically continuous innovations have “more disturbing” influence on the established patterns. Excluding discontinuous innovations, it is difficult to ascertain when disrupting effects of the innovation, especially, dynamically continuous ones, justify a new life cycle for the innovation in question. Consider a product such as television. When a black and white television changes to color TV at T_1 , a remote control added at T_2 and internet connection was made available at T_3 , at what time period is it appropriate determine television identity has substantively changed and hence started a new life cycle?

3. Discussion

In the following sections, following Lancaster (1966), we consider a product as a “bundle of physical and non-physical attributes.” The organized whole of these physical and non-physical attributes (die Gestalt) will constitute its identity. For the purpose of illustration, consider a product such as telephone which goes through changes over a period of ten years. (see Figure 2) Here, the objective is to establish the criteria for deciding when the identity of a product changes over time due to a change or modification of its parts.

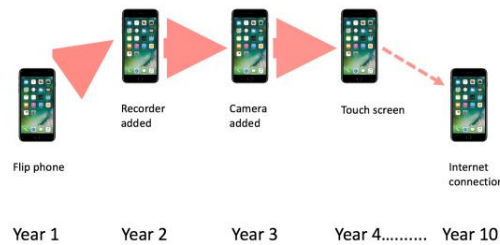


Figure 2

3.1 Changing Identify Over Time

It is customary in philosophical literature to distinguish identity at a time, from identity across the time. Identity holding at a single time is referred to synchronic identity and identity holding across time as diachronic identity. If the criteria of identity are applied synchronically, the question is whether two objects coexisting at a given time are identical. For example, whether Coke in glass at time t_1 , and Coke in a can at time t_1 are identical? If the criteria of identity are used diachronically, the question is whether or not the identity of a given objects remains the same over time (For example the identity of Coke in times t_1 glass, t_2 can, time t_3 diet coke, and so on).

There are different schools of thoughts related to the identity of objects over time. In the following sections, we briefly discuss the assumptions and ramifications of these schools of thoughts for the concept of PLC.

Assumption 1: Ordinary objects survive some gradual change but not all. Under this assumption, the identity of telephone will change sometimes between year 1 and 10. The limitation of this solution stems from its arbitrariness; why adding recorder in year 2 to the telephone does not change the identity of the telephone, but adding camera in year 3 does?

Assumption 2: Parts principle/endurantist: In the literature of philosophy, the terms “edure,” and “perdure” are used to distinguish two ways in which an object can be thought to persist through time (Stanford encyclopedia of Philosophy, 2014b). Such a distinction has been one of the central debates in contemporary metaphysics. Endurantism accepts the transitivity of identity, i.e., ordinary objects, in our case telephone, will persist by being wholly present at each moment at which they exist.

From a historical perspective, it is plausible to evoke the concepts of intrinsic and extrinsic properties of a product. According to Moore, (1903), a distinction can be made between things that are good in themselves, or possess intrinsic value, and those that are good as a means to other things (extrinsic value). As long as changes are related to extrinsic properties a product, the identity of product in question remains the same over time. For illustration purpose, let’s assume that a product such as Coke, is sold in time t_1 , plastic container, in time t_2 , aluminum, and in time t_3 3 glass bottles, and so on. All of these changes can be considered extrinsic and hence do not change the identity of coke. However, once coke, changes from regular coke to diet coke, an intrinsic property of the product has been changed.

The assumption 2 leads us to the conclusion that at the end of year 10, the phone, despite the fact that all its components have been changed, is the same object as in year one.

The difficulty in above argument, as pointed out before, is determining the criteria for extrinsic and intrinsic properties of a product.

Assumption 3: An object goes where its parts goes: This solution that a change in one attribute of the telephone changes its identity is not some middling plan. Rather, as soon as one attribute is changed or modified we have a new product and hence new PLC. This idea rejects both assumptions 1 and 2. It offers a stronger thesis in their place, i.e., ordinary objects never survives any change. Roderick Chisholm, a 20th century American philosopher, by introducing the famous Ship of Theseus Paradox, and the idea of rivers flowing into one and one flowing into many other (Chisholm, p. 211) argued that there has to be some point in which the original Ship of Theseus and the rivers discontinue being numerically distinct identities. Chisholm in a sense denies the idea of transitivity of identity. He points out that an object may have a set of properties at one point and another set off properties in another time period. The idea of “alteration”, in his view does result in a changing of the identity.

By drawing from Bishop Butler's Dissertation 1, Chisholm states that it is only in a "loose and popular sense" as contrasted with the "strict and philosophical sense" that we may speak of the persistence of objects over time (Chisholm 211). One should not infer from the above statement that there are different degrees of identity. It is only in 'a loose and popular sense' that Chisholm speaks of the persistence of objects such as boats and houses. Construing Butler's remark, Chisholm points out that there is not a loose kind of identity, but there is a loose (and popular) use of the *being verb "is"* of identity. According to Chisholm sometimes, it is convenient to "feign identity". Chisholm's notion of feigning identity is clearly stated by Reid. "All bodies, as they consist of innumerable parts that may be disjoined from them by a great variety of causes, are subject to continual changes of their substance, increasing, diminishing, changing insensibly. When such alterations are gradual, because language could not afford a different name for every different state of such a changeable being, it retains the same name, and is considered as the same thing" (Reid, p. 246).

Assumption 4: Ordinary objects have temporal dimension/ Worm Theory/Stage Theory:

Another solution to the idea of changing identity over time is called the worm theory, stage or perdurance theory. This theory requires us to reconsider the way we are accustomed to think about ordinary objects. Having our telephone in mind, there is a telephone at year one and a telephone at year 10. Our challenge is to figure out whether telephones at year 1 and 10 are the same or there are two distinct telephones. The implicit assumption that worm theory rejects is that ordinary objects like phones are three-dimensional objects, where the three dimensions are spatial dimensions. According to worm theory, ordinary objects really have four dimensions, three spatial and one temporal, so there is no telephone wholly present at year 1 or at year 10. Rather, there is one worm like phone which has a part A at year 1 at one end, and as a part B at the other end. (see Figures 3 and 4).

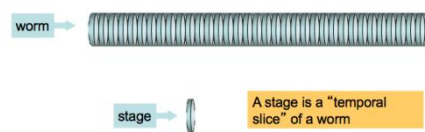


Figure 3

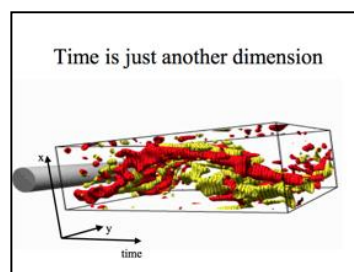


Figure 4

Source: <http://ontology.buffalo.edu/smith/ppt/Bittner/PerduranceAndEndurance.pdf>

Note: Time as the 4th dimension

4. Conclusion

After almost 7 decades since the introduction of PLC concept, there is no agreement among academicians concerning the utility of PLC concept. A group of academicians view PLC a useful concept in market forecasting, planning and controlling. Usually these claims are not supported by any convincing evidence. There are also academicians who consider the PLC as a relatively useless concept. This group believe that sales histories of products depend on a wide variety of factors such as the rate of technology change, consumers' tastes, the economic, environment, population growth, and so on, and hence difficult to group them with "Iron Laws" differentiating one PLC stage from another. It is

safe to say that the majority of marketing managers are familiar with the PLC concept in theory. However, one might question how knowledge of the concept actually impacts strategic decision making in practice.

Given these points, we are inclined to suggest that the PLC has little strategic, applied relevance to either academicians or practitioners until such time that it is better conceptualized. By ignoring the PLC, the marketing discipline will lose very little due to the lack of precision to date in operationalizing the concept and many of the questionable assumptions upon which it is based. If the attachment to the idea of PLC is too strong within the marketing discipline, the following course of action may be followed:

1. Accepting the assumption 1: *ordinary objects survive some gradual change but not all*. products' PLC will survive some gradual change but not all, i.e., at some point in time, product will assume new life cycle. This policy recommendation, despite its arbitrariness, has the advantage of relying on the managers' historical experience with their line of products.
2. Accepting Assumption 2: *parts principle*. This recommendation is more appropriate for companies marketing products with little or no change in the products' "intrinsic properties." A company may make changes such as package size, type of container used or even employ new technology in producing the product. However, such changes will have very little or no effect on the consumption behavior of the consumer.
3. Accepting Assumption 3: *an object goes where its parts goes*. This recommendation is more appropriate for companies continuously introducing changes to their products resulting in significant change in target audience consumption behavior. Examples include, paints such as Bella and Birch textured paints that are applied like wallpaper but without glue, using a special applicator, new generations of computers and cameras.

Pragmatically, much of the confusion regarding the newness of products and the marketing manager's application of the PLC concept as a guide to strategic changes in the marketing mix over time can be reduced by considering the product's identify with respect to either the "newness" of the product's category, the newness of the brand itself, or the newness of the market segment(s) toward which the product is targeted. Following are several scenarios that are useful in identifying strategic opportunities related to product newness.

1. A company may develop and launch an innovative product that heretofore did not exist and is clearly new to the world. Such new products essentially create a new product category for either an existing or new market. An example might be Apple's iPhone which both targeted consumer's existing communications needs as a telephone as well created a new market as a smart phone offering new user applications beyond traditional telephone use.
2. A company may find and develop an application for a successful existing product that carves out an entirely new product category for them. Rocket Chemical Company, a small San Diego firm, worked on a water displacement chemical for the Atlas missile aerospace market in 1950. After forty development attempts resulted in a final formulation, this industrial chemical was named WD-40 (water displacement formula 40). Over the years the chemical was found to have many non-aerospace applications in both industrial and consumer markets. The product was repackaged, remarketed, and successfully created a new aerosol dry lubricant product category. Today, it is estimated that 4 out of 5 households report having a can of this former aerospace product on hand for home use.
3. A company may offer products that are new additions to an existing successful product line. An example might include Anheuser-Busch adding Bud Light to its existing flagship Budweiser line. Many firms practice this product strategy which results in ever-increasing product line depth over time in an effort to offer more in-line product variation choice to loyal customers.
4. A company may make improvements to an existing product and remarket the item as new. Such improvements might involve enhancement of product quality or even a change in packaging. For example, Coca Cola's original 8-ounce Coke product has been repackaged over time into a plethora of package sizes to appeal to a wide range of users. Another example might include Campbell's Soup repackaging its family market soup line into smaller cans and adding a new Soup for One line aimed at single-person households.
5. A company may take an existing product and successfully reposition it by finding and developing new user applications. A classic example of this strategy is Arm and Hammer's baking soda which originally a household baking product staple has been repositioned in line with countless other household applications as a cleaner, deodorizer, etc.
6. Finally, a company may find that over time substantial product cost reductions associated with improvements in technology, advances in manufacturing efficiency, or economies of scale may enable selling price reductions that open the marketing door to additional segments previously not viable because of high initial pricing.

Regarding these preceding scenarios, we wish to offer two concluding comments. First, the PLC concept's practical application lies in its potential usefulness in the timing of strategic adjustments to the firm's marketing mix over time. The PLC concept has merit only when more careful conceptual attention is given to the idea of product newness as part of the product's identity. In applying this concept, marketing managers need to carefully consider the product or service offering's newness and whether this relates to the user market segment, product category, or the brand itself. That is, each may be thought of as exhibiting a unique PLC. Second, the PLC reflects the market's reaction to the marketing offering over time. While one may distinguish between products that are new to the firm versus products that are new to the consumer, product newness ultimately should be assessed based upon consumers' perceptions since it is the market's reaction to the firm's product strategy that fundamentally determines the PLC's duration and shape.

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