The Cost Structure - Key Element in the Development of Product Policy

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Abstract

In the context of accelerating globalization, organizations need to face increasingly high challenges related to competitiveness. However a permanent adaptation to the impact of environmental factors involves actions that imply significant costs with a great impact on the profitability of the organization.

In this regard, planning the launch of new products or services requires a strategic approach, a structural analysis of the costs and the identification of opportunities to increase optimization with the aim of increasing the effectiveness of the product policy.

Key words: costs structure, product life cycle curve, product policy, costs management, product profitability.
J.E.L. classification: M11, M21.

1. Introduction

In order for an organization to perform its activities it needs to adapt more and more to the market conditions and to integrate new technologies. Regardless of the field of activity (from construction, machinery and equipment to the consumer products industry), the management of organizations is required to pay close attention to all elements influencing the success of a product. In this respect the factors determining the success of a product can be weighed against the costs they generate during the lifetime of a product.

2. Categories of costs related to the product life cycle curve

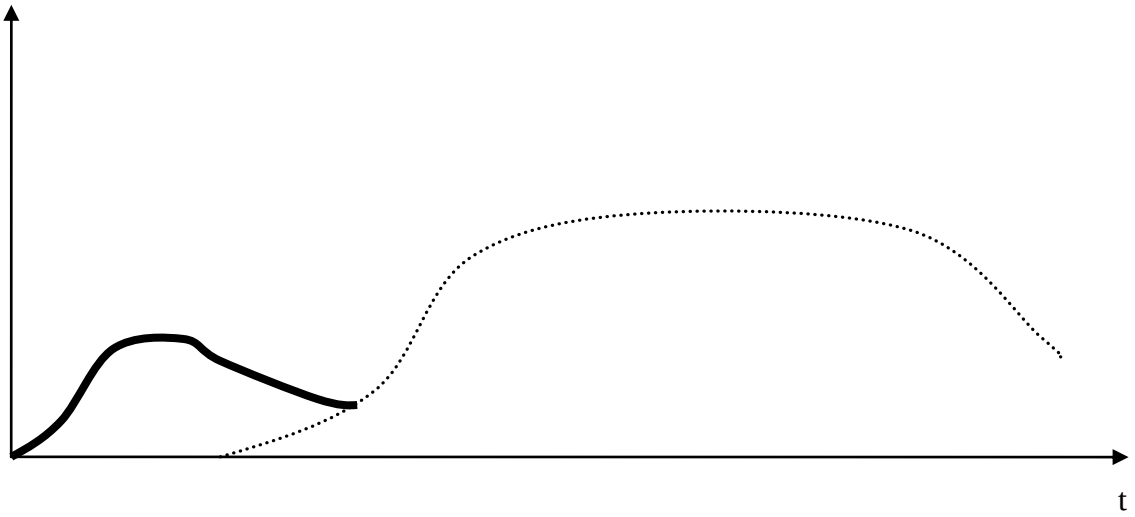
For the proposed analysis we grouped the costs depending on the time of occurrence with respect to the product life cycle curve (Purcărea, 1994, 39). Thus, we consider the following cost structure:

- costs of research related to the introduction of a new product in the portfolio and costs of development/ adaptation mainly oriented on 'updating' the production base;
- raw material costs (acquisition, storage, transportation);
- production costs (other than raw material costs);
- costs of sales (taking into account the logistics of the sale of products and the promotion costs);
- administrative costs;

Regarding the first category of costs (the R&D costs) in relation to the product life cycle curve, they can be found closer to the "introduction" stage on the graph, with the possibility to expand in time throughout other stages due to the need to improve products, to satisfy some needs that require new functionalities of the product or simply to prolong the lifetime of the product. The figure

bellow illustrates a function of the research costs in relation to the product life cycle curve. It should be noted that this category of costs includes all the studies necessary to obtain the product prototype, including the costs for unreleased prototypes but which have allowed the accumulation of know-how. (Cârstea, 2000, 35)

Figure no. 1. The R&D costs



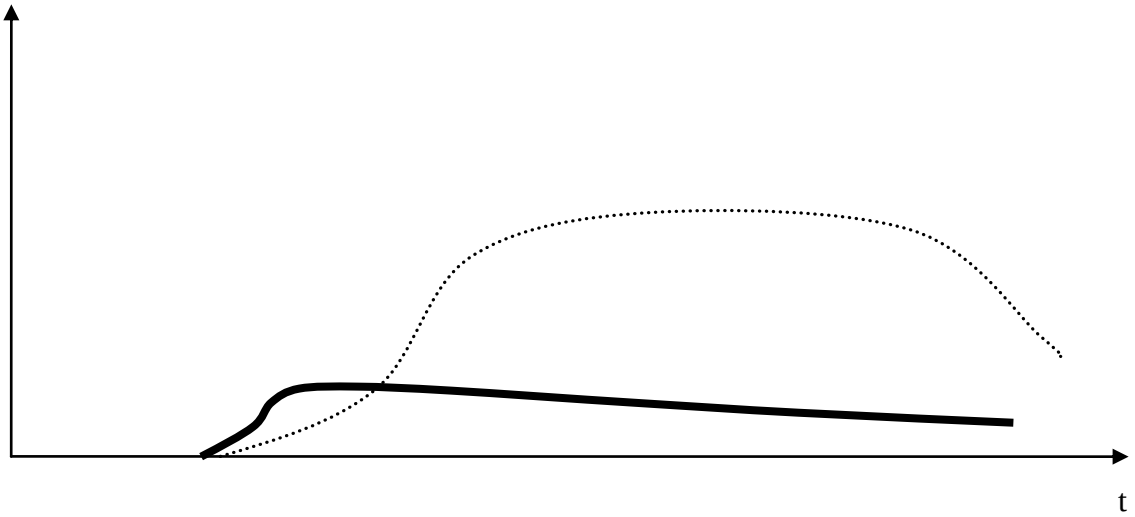
..... product life cycle curve

Source: based on (Cârstea, 2000, 35)

Regarding the costs of raw material acquisition, they can be reduced as a result of a good planning of their acquisition. Material requirements planning over a long period of time allows the negotiation of favorable purchase prices, the reduction of transportation tariffs and the optimization of storage. (Deac, 2014, 326-349)

The product policy which takes into account both the product and the price, by correctly estimating the quality and quantity of marketable products, provides the necessary information to optimize the costs of raw materials acquisition. Given the large share of these costs in the total cost (generally between 25-40%), their optimization provides a significant increase in the product profitability (Băşanu, Gh., 2012, 23). Figure no. 2 shows the evolution of these costs in relation to the product life cycle curve. (Cârstea, 2000, 66)

Figure no. 2. The costs of raw material

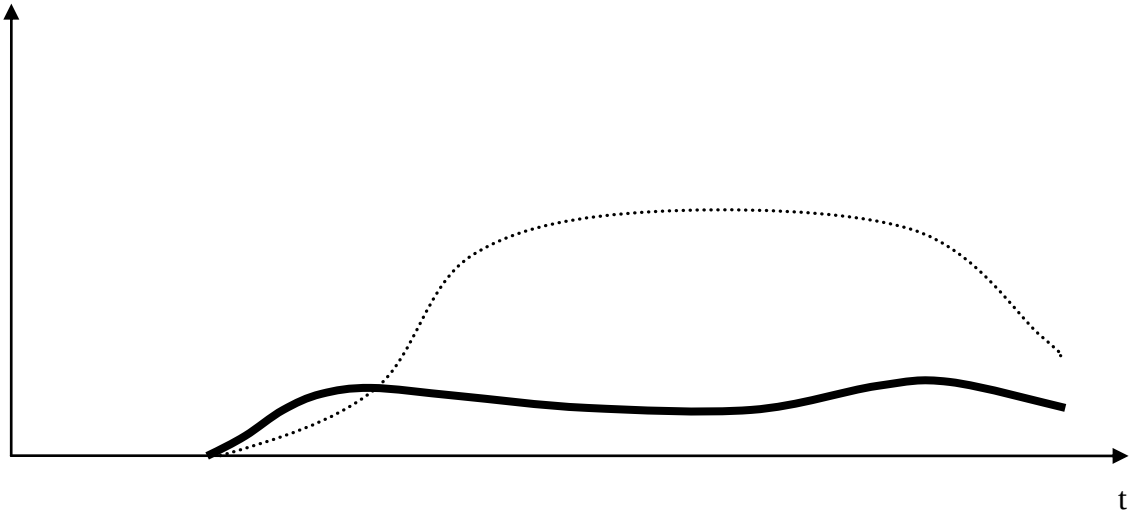


..... product life cycle curve

Source: based on (Cârstea, 2000, 66)

Production costs, along with the research and development costs are those that add value to the products/ services; after the manufacturing activity is performed they mainly yield advantages through product differentiation related to competitors (Deac, 2014, 286-325). Figure no. 3 presents the evolution of these costs in relation to the product life cycle curve. (Cârstea, 2000, 246)

Figure no. 3. The production costs



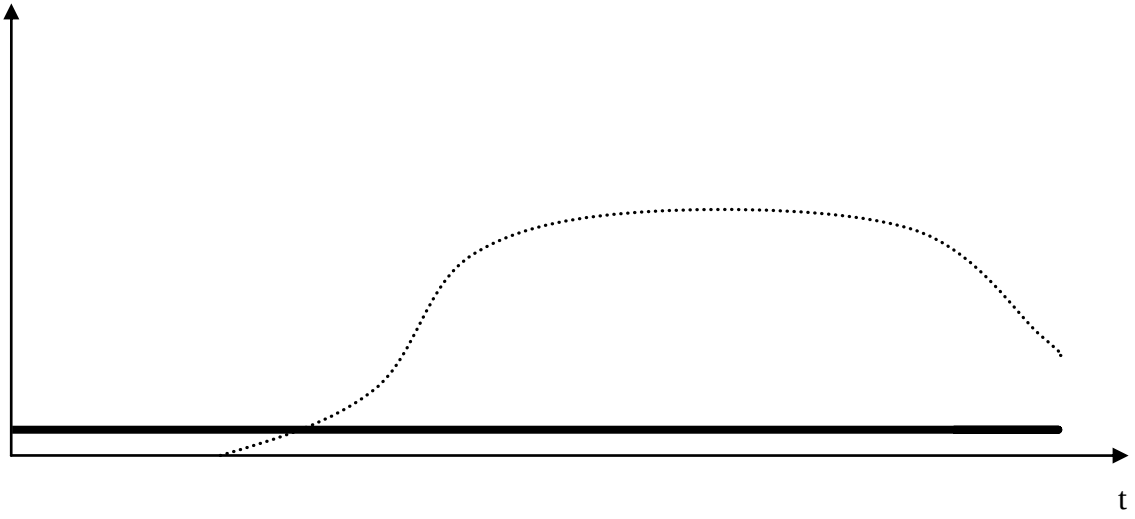
..... product life cycle curve

Source: based on (Cârstea, 2000, 246)

As can be seen in the figure above, changes in production costs are characterized by two points of maximum determined by two important influence factors: the gain of experience (which incurs significant costs) and the wear and tear of fixed assets with significant impact on the production costs.

Regarding the administrative costs, mostly fixed costs, they have a generally constant evolution throughout the product life cycle. The evolution of these costs is influenced by factors beyond the product policy. (Ursachi, 2007, 68) Figure no. 4 shows the evolution of these costs in relation to the product life cycle curve.

Figure no. 4. The administrative costs

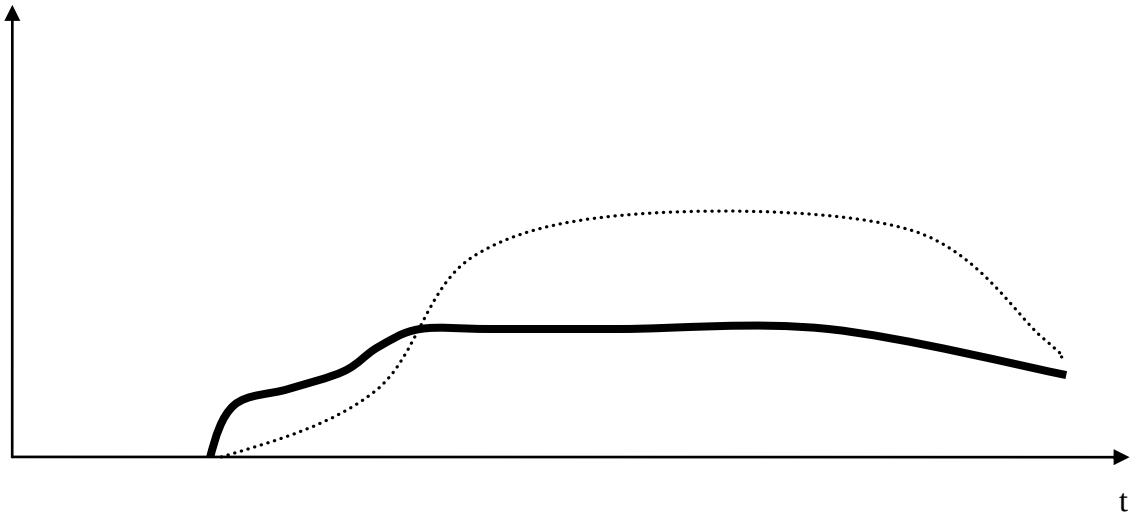


..... product life cycle curve

Source: based on (Ursachi, 2007, 68)

The last major category of costs, the costs of sales, are characterized by a particular complexity due to the fact that these costs conclude the cycle of costs and directly influence the sale of products. (Bruhn, 2001, 150)

Figure no. 5. The costs of sales



..... product life cycle curve

Source: based on (Bruhn, 2001, 150)

Regarding the other categories of costs, due to the major impact of factors depending on the industry, their value will be considered negligible in the present study and will be expressed by the free factor "z".

The following figure summarizes all of the costs we addressed in this paper as well as the revenues related to a product on the market. The main objective regarding the lifetime of the product to be considered here is profit maximization. For this purpose the setting of a function for each category of cost is required, based on the graphs considered, which will be defined as:

$$y=\sqrt{x}/\left(\sqrt{x}-\ln\left(x\right)\right) \quad (1)$$

or

$$y=a\sqrt{x}/\left(b\sqrt{x}-c\ln\left(x\right)\right) \quad (2)$$

The total costs for each category will be:

$$y=\sum\sqrt{x}/\left(\sqrt{x}-\ln\left(x\right)\right) \quad (3)$$

or

$$y=\sum a\sqrt{x}/\left(b\sqrt{x}-c\ln\left(x\right)\right. \quad (4)$$

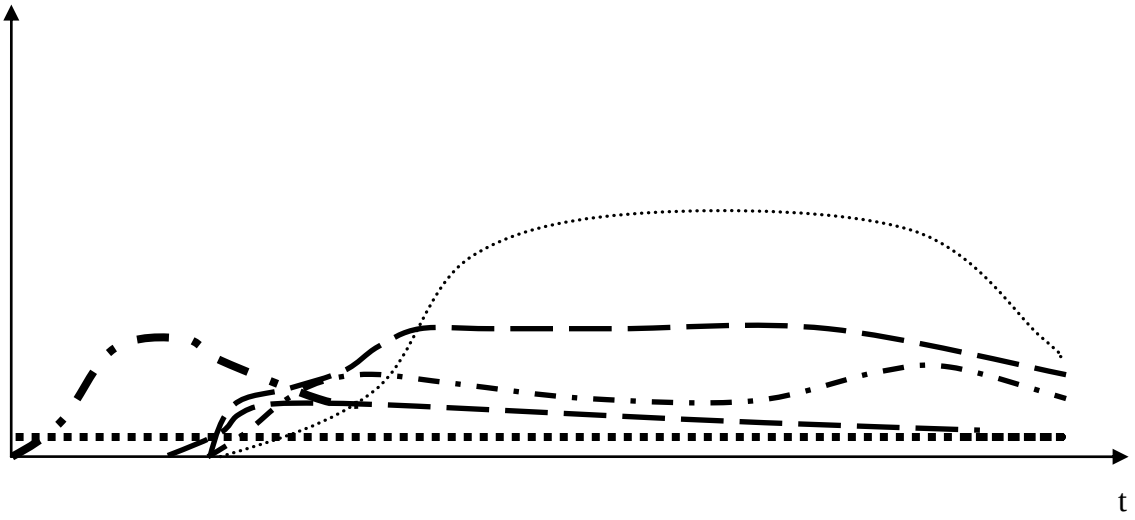
Where x represents the point of reference and a, b, c are coefficients. In our example a period of 36 time intervals was considered, structured as follows:

- 1-10: corresponding to research activities performed before the introduction of products on the market;
- 11-15: the introduction of products stage;
- 16-23: the growth stage;
- 24-32: the maturity stage;
- 33-36: the decline stage.

The intervals are indicative (strictly for illustration), in practice, they may substantially differ

from case to case. (Dinu, 2000, 102)

Figure no. 6. The total costs



Source: based on (Dinu, 2000, 102)

The optimization of costs functions associated to the product policy takes into account the synergy effect that is obtaining an overall maximum effect (Dinu, 2000, 102). The aim is to reduce costs overall, as evidenced in the following formula:

$$min \sum y \quad (5)$$

The importance of the synergy effect is determined by the fact that the costs structure includes interdependent elements. For example, high R&D costs can enhance the reduction of the production or sales costs. At the same time, high R&D, acquisition and production costs can generate high quality which certainly provides a significant reduction in the costs of sales.

3. Conclusions

First of all, in order to have an efficient product policy a diminution of the time interval previous to the introduction of the product is required, a stage characterized mainly by costs of research, development, assimilation in production and eventually raw materials costs for the testing and eventually the introduction of products stages.

Secondly, in cases in which the circumstances require, the post-decline stage is diminished, a stage during which costs associated to warranty periods, maintenance and repair of products sold are recorded. For some product categories this stage may actually be omitted.

4. References

1. Băşanu, Gh., Pricop, M., 2012, Managementul aprovizionării şi vânzărilor, Bucureşti: Economică.
2. Bruhn, M., 2001, Orientarea spre client, Bucureşti: Economică.
3. Cârstea, Gh., 2000, Asigurarea şi gestiunea resurselor material, Bucureşti: Economică.
4. Deac, V., 2014, Management, Bucureşti: ASE.
5. Dinu, E., 2000, Strategia firmei, Bucureşti: Economică.
6. Kotler Ph., Saunders, J., Amstrong, G., Wong, V., 1999, *Principiile Marketingului*, Bucureşti: Teora.
7. Kotler, Ph., 2001, *Marketing Management*, (11th Edition), New York: Prentice Hall.
8. Nicolescu, O., Verboncu, I., 1999, Management, Bucureşti: Economică.
9. Purcărea, Th., 1994, Management comercial, Bucureşti: Expert.
10. Ursachi, I., 2007, Management, Bucureşti: ASE.