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PROBLEMS ON TRADE-OFFS AMONG CHARACTERISTICS OF A PRODUCT IN MARKETING: AN ECONOMIC THEORETICAL APPROACH

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I.

"Product planning" (product development, policy, and strategy) constitutes a function, among a great variety of functions of a company, which plays a remarkably important role in company management. W. Lazer [1] states as follows:

Planning distinctive products becomes a major task, since demand cannot be taken for granted by any one company when there is abundance.

The company is thus forced to make an effort to create a product advantage, resulting in achievement of product differentiation, to be desirable, of the market advantage. Meeting a major challenge in designing a product and service mix, product planning determines the scope and direction of company activities.

Indispensable to product differentiation and diversification is a survey from every viewpoint for making a product acceptable in the market. Important as it may be to look into a market segment in connection with promotional policy, it is more important to interfere even in the characteristics of a product serving for product differentiation. Ways in which the company grasps, estimates, expresses and ships characteristics of a new product present a serious question in product differentiation and the product itself, as they are simultaneously related closely with the growth of the company.

Much time and resources are accordingly spent on marketing research seeking information of consumers' demands with respect to characteristics of a new product.

M. Tamura [2], however, points out the possibility of a paradox on the part of consumers because the system of gathering marketing information does not work as is expected.

The next two are considered as conditions of the paradox: Firstly, concerning minor characteristics, a company has to compete with other companies for the lack of ability to collect long-term information because of imperfect marketing research techniques now available. A favorable characteristic at a specific point of time is likely to lose its appeal with the lapse of time.

Secondly, trade-offs lie between characteristics left out of consideration and newly considered ones. It is fairly important, because it signifies that the transition of characteristics always goes from the fundamental to the secondary.

So far, assuming that various points at issue on characteristics present urgent problems to be solved practically; a further investigation needed to grasp, theorize, and solve them, not as a mere emergency measure but as marketing pursuits.

But, as we seem to have no generally accepted theory in marketing yet, we are called on to grasp the problems through analyses of results of a sufficient investigation combined with researches in other related fields.

Under the circumstances, economics has taken the initiative in developing the theory and analysis of consumer behavior, resulting in many useful researches published.

In this sense, it would be acceptable as a matter of course that we probe into economics of marketing as a new approach whereby light may be shed on the process of formulating a theory as to problems offered in the foregoing.

II.

First of all, let us see how economics deals with characteristics in the theory of consumer behaviour.

The microeconomic theory has long contributed to a study on the consumer's preference structure — to generalize a utility concept so that all of the forms of marginal utility and any kinds of relations among various goods may be approved.

It is, however, said that this process nowadays begins to walk, to some extent, in the opposite direction. (For instance, see Houthakker [3].)

K. J. Lancaster [4] also presents such a type of model that assesses consumer behaviour from the point of view of preference to the characteristic, regarding that utility is extracted not from a product directly but from its characteristics to satisfy the need.

Hence, we think Lancaster approach very powerful to analyse various problems of the product and those related to the product, particularly an urgent question, trade-offs among characteristics. The consideration from

the point of view of the theory is significant to cultivate a better understanding of a sentence and a structure of the problem. It is J. M. Carman [5] who suggests the adaptation of this theory to the problem of consumer behavior in marketing. It is applied in economics as a theoretical foundation of the Hednic index, which is the problem of the price index [6]. It is followed by a general view of this theory and the experimental development of the problem just offered.

The following is the substance of the theory: according to a classic indifference curve analysis, a bundle of commodities is determined so that its own utility can be maximized under given conditions (income and the price of a product). Utility is, therefore, obtained from the quantity of each product. An illustration in the case of two products is Fig. 1.

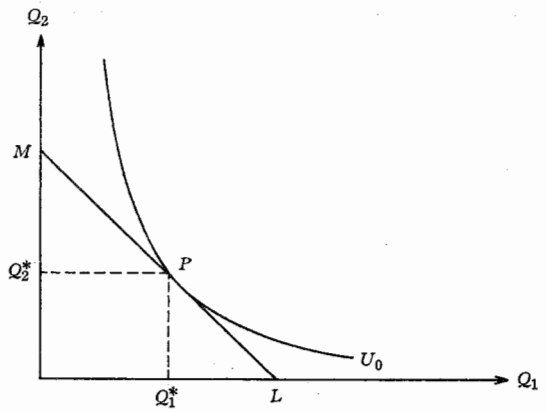

Fig. 1.

In the co-ordinate Q_1 and Q_2 represent the quantities of products 1 and 2 respectively, while ML forms a budget line indicating the level of income with its slope accounting for the ratio of price between goods 1 and 2. Curve U_0 is an indifference curve, which meets ML at P, where the consumer can get the maximum utility, the quantities of products 1 and 2 being denoted by Q_1^* and Q_2^* respectively.

Note that in the Lancaster analysis the indifference curve does not belong to this graph. For, he thinks that consumers, as seen before, do not demand a product; instead, they demand characteristics. In Fig. 2 we assume two characteristics and five products. In this figure, the rays (1, 2, 3, 4, and 5) represent increasing quantities of characteristics with increasing quantities of each product.

On the other hand, once the price of each product and the quantity of each characteristic per unit are determined in space C, a budget line is easily drawn.

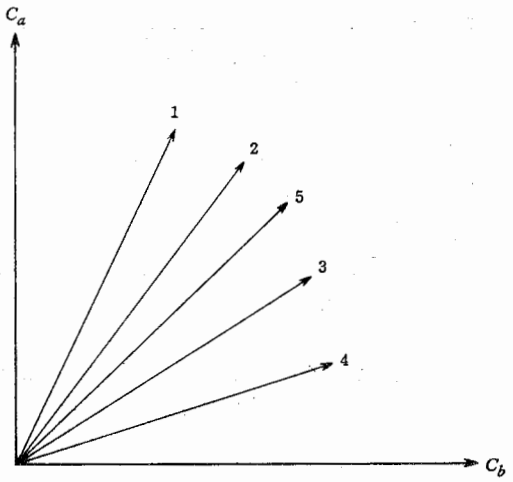

Fig. 2.

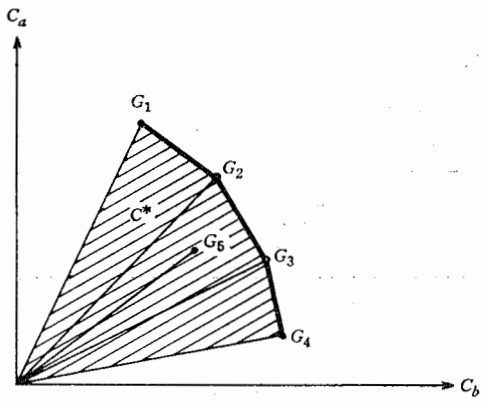

Fig. 3.

Thus, one will find out all budget points, and buy a combination of products by linking them. Thus analysis will turn out an efficient frontier with a combination that will yield more for a sum of money than other combinations.

The following describes the decision process: Should all of one's income M be paid for the i-th product, G_i in Fig. 3 represents the purchasable quantity as well as the corresponding quantity of the characteristic of the i-th product.

The shaded part represents a set, denoted by C^*, of attainable characteristics; then the efficient consumption is limited to the part of the boundary marked by a heavy line in Fig. 3. At the present price, G_5 has never been chosen by the consumer. An exact combination to be chosen will depend

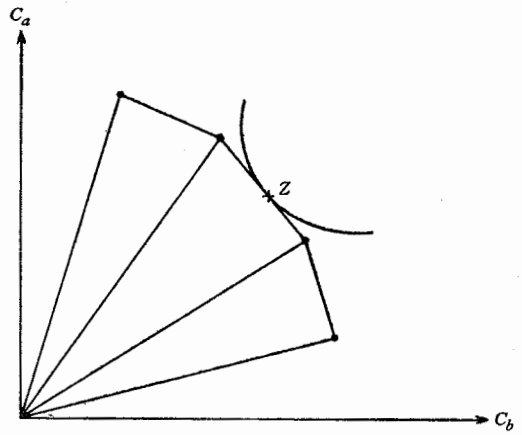

Fig. 4.

on the point of the efficient frontier that is tangent to the consumer's private indifference curve, Z on the graph. (See Fig. 4.)

In the figure, rays represent options of the company's decision in product planning and promotional strategy, a budget point represents the company's pricing decision, and similarly an indifference curve represents options of the consumer's private preference decision.

III.

Now, in brief summary of Lancaster's theory, it is supposed that the quantity of property increases with increasing quantity of the product; namely, if the quantity of the product increases twofold, the quantity of characteristics doubles. But this is an inconvenient assumption in the sense that, if we have two cars, the durability of the cars also increases twice.

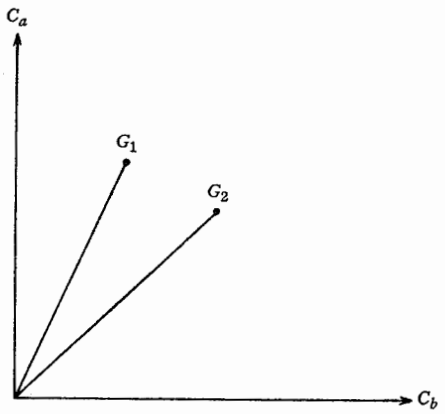

Fig. 5.

Considering the reality a step closer in a model, we change the meaning of G as follows: As companies 1 and 2 produce qualitatively different types of cars, G_1 in Fig. 5 represents a car of company 1, which counterbalanced a certain portion of income M of the consumer; therefore, the quantity of characteristics obtained from the car corresponds to it. Meantime, G_2 is treated likewise as to a car of company 2.

We now introduce a question of trade-offs which is likely to arise in actualities, at least, when the case calls for an urgent and short-term action; namely, a company has to deal with a product in need of change in its characteristics within a given cost and technical constraints.

A trade-off among characteristics of the product of company 1 (e. g. car) is expressed by a straight line, solid and dashed, passing through G_1 as shown in Fig. 6.

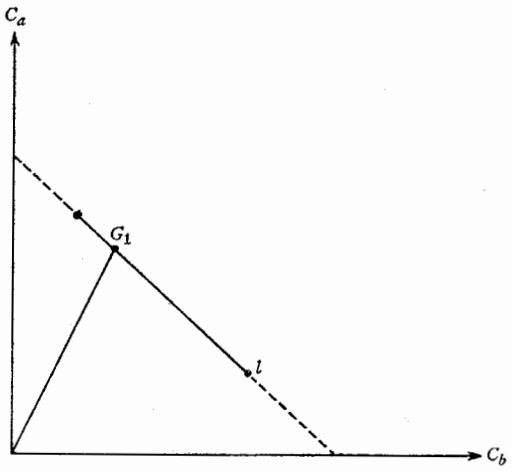

Fig. 6.

This is understood as something indicating technical constraints to company 1, which signifies such a relation that the acceleration of the engine (C_a) should be reduced to allow the room of the car to be broadened (C_b), the reverse also being true. In addition, the tangent of l stands for the degree of substitution among characteristics.

The noteworthy point is that a move more than a certain amount of substitution among characteristics may happen to harm the product itself. Accordingly, it will be, for instance, the solid part of l where the company can actually achieve a trade-off among the characteristics.

Suppose that company 1 is at a disadvantage in sales of cars, as compared with company 2. When the former makes a decision of raising C_b, as being more advantageous, understanding from various kinds of marketing

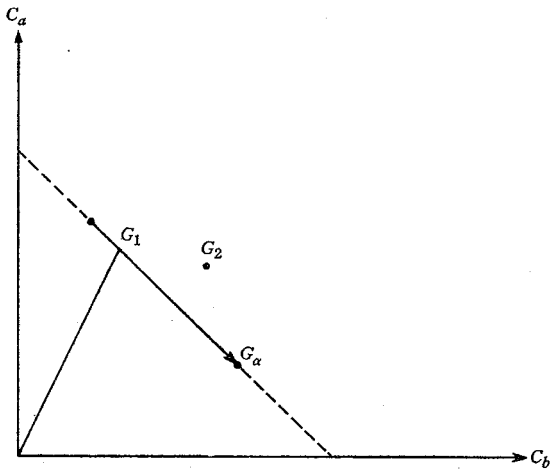

Fig. 7.

researches that it is caused by the degree of relative ratio of characteristics, the company remodels cars, for instance, at G_α like in Fig. 7, sliding on l — to conduct promotion by broadening the room of the car at the sacrifice of the acceleration.

Here, various aspects of affairs can be imagined in the relation between the position on the co-ordinate of G_2 of the competitive company 2 and the consumer's utility. For instance, in the case of Fig. 7, as for G_1 it can be found that C_a is superior but C_b is inferior in relation with G_2. Next, it is indicated that alternation into G_α makes it possible to reverse the characteristic in relation with G_2.

Does this really work in favor of company 1? Before that, we have to know the next problem. First of all, if the consumer really prefers C_b to C_a, it seems that G_α is certainly more acceptable to the consumer than G_2. But, in light of the consumer's indifference curve (steep) as in Fig. 8, the locus of G_α has to move to such a point as is impossible for company 1 to substitute the characteristic concerned any more, the point more advantageous to G_1 than to G_2; otherwise the car has to undergo, at most, a total alteration. It is likely to provide the car with enough room at the great sacrifice of the acceleration of the engine.

But this alteration is not necessarily a desirable one to company 1, because this, as a matter of fact, calls for the more sacrifice to the fundamental characteristic, which is a paradox resulting from consumer orientation. In this respect, the U. S. automobile industry has recognized the necessity for a well-balanced design between the size of the car and the displacement of its engine in that drivers have found it uncomfortable to drive cars whose size has been reduced because of the need for saving on energy but whose

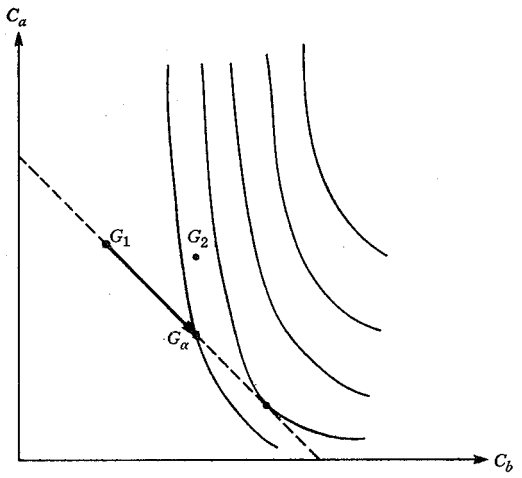

Fig. 8.

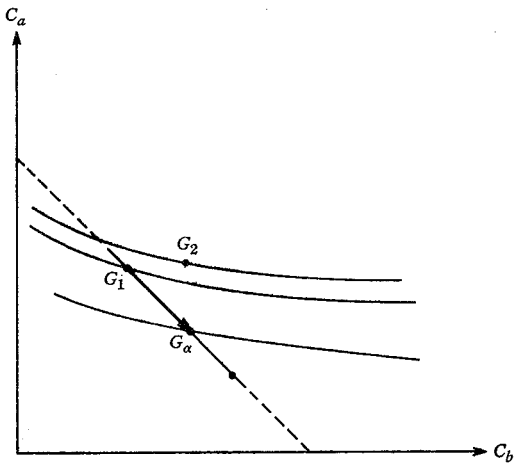

Fig. 9.

engine has continued to have a large displacement.

Next, when the indifference curve has a smooth slope, it leads to the worse result in the remodeling of a car of company 1 as seen in Fig. 9.

Accordingly, when there is a trade-off among characteristics of a product, the company can hardly secure the advantageousness of the product in the market without considerably good conditions attached thereto. If it succeeds temporarily, the company would have a hard time to spend a large sum of money satisfying a user's claim after the lapse of a certain time. The apparent success in the market this time, namely, the high rate of the market share, often causes the myopia in marketing; consequently the

company gets into a danger of failing to recognize its own defects. The possibility of another paradox is that the more the entire industry intends to cater for the consumer, the more an individual company excludes the fundamental characteristics of its product.

The company, of course, can make a choice of another policy. Namely, it would conduct an active campaign by means of advertisements rather for a change in consumer utility than for a physical change related to characteristics. Anyhow, the consumer also has to come to a full recognition that some of products, on occasion, rebound upon the consumer as a definite blow, if the consumer relies only on the appearance when purchasing products.

A trade-off among characteristics is understood to signify that the company runs a great risk in connection with judicial problems involving the consumer.

The question left to be solved is the premise of the theoretical formulation related to characteristics of the product, namely, in regard to the understanding of characteristics as an appropriate standard for judging in choice of a certain product, such as four criteria proposed and proved by P. E. Green and Y. Wind [7].

Their criteria should be looked into closely so that a concrete formulation may be given to the question of characteristics, though they are not enough in answering the degree of appropriateness as to some specific characteristics in a situation calling for selection.

IV.

Drawing on an economics approach, we have attempted to make some consideration in treatment of an actual topic. Persuasive as the conclusion may not be yet at present, the following may be allowed as an addition: The company is called on to pay particular attention to the societal and environmental factors related to its products. The policy to be worked out by the company is not of the short-term and superficial nature. Instead, the company behaves itself with due respect to long-term benefits which the society must enjoy as a whole. The introduction of a social marketing concept is indispensable in this sense; urgent expectations are entertained of the realization of its content, too.

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