A REVIEW PAPER ON CONJOINT ANALYSIS TO THE FUZZY FRONT END OF A NEW PRODUCT DESIGN

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ABSTRACT

New products that deliver added consumer value contribute significantly to the success of companies. In the numerous studies of new product performance over the years, consensus has been developed that the understanding of consumer needs is of paramount strategic value, especially in the early stages of the product development process. During these early stages, the product has not yet been specified and the aim is to search for novel product ideas from a marketing and technological perspective. Despite their importance, several studies indicate that consumer research methodologies are underutilised in the early stages of new product development. The aim of this thesis is to analyse key issues and develop and illustrate appropriate use of consumer research methodology at early stages of the new product development process, as the most distinguishing characteristic of a successful product development project.

Keyword : - *NPD, Super Conjoint analysis, Consumer research.*

1. INTRODUCTION

Incorporating the 'voice of the consumer' (VoC) in the early stages of aNew Product Development (NPD) process has been identified as a critical success factor for a new product launch (Bjork & Magnusson, 2009). Yet, this step is often either ignored or, poorly executed. There are enough literature on 'why' new products fail (Henard& Szymanski, 2001) and also 'How' NPD could be made successful (Dubiel& Ernst, 2012), but the NPD performance continues to be poor, which perhaps points to an ineffective execution of the entire product development process. As a result, a lot of money is lost and companies lose their competitive edge. This leaves them behind in the race for growth and prosperity.

The NPD failure may be due to lack of familiarity with the various VoC methods available or the lack of understanding of a structured approach to product development. The thesis attempts to illustrate the benefits of capturing the VoC early during the product development life-cycle and funnelling it into the drawing board, using a casestudy, which demonstrates the application of a statistical technique named CONJOINT ANALYSIS to the FFE of a product design, incorporating the VoC inputs. Figure: 1.1 depicts that for the success of a new product there must be perfect co-ordination between Research and Development(R&D), Marketing and Manufacturing. Many studies on the cost of production have shown that maximum costs are largely determined during the design phase of the products. Perrin, (2001)proposes an average trend of the costs incurred throughout the different phases of the life cycle of a product before mass production (refer Figure: 1.2). The design activity accounts for 15% of the time spent, but by this time freezes 75% of the total product cost. This clearly shows that the 'committed cost' in a product is very high, in the early stage of NPD. The importance of NPD for continued survival and competitive success, coupled with the high- risk activity that it is, makes it not surprising that the NPD process has received considerable attention in literature. New product performance has been shown to be complex as many and diverse measures of success are used in NPD performance studies.The reasons for success and failure of NPD are heavily researched from several points of view. In the early years of new product performance analysis, innovations were examined from the point of view of either the factors associated with success, or those associated with failure. A common the mein a number of studies is that consumer focus is essential for new product success. The core of successful NPD has been defined as: 'how to optimally exploit one's technological capabilities for the fulfilment of carefully selected market opportunities. Characteristic ofthis definition is that no matter what technology is used, it has to be employed in products that deliver value in the eyes of the consumer. For the NPD process this implies that consumer needs have to be taken into consideration from the earliest stages on. This realisation has become critical as a result of many
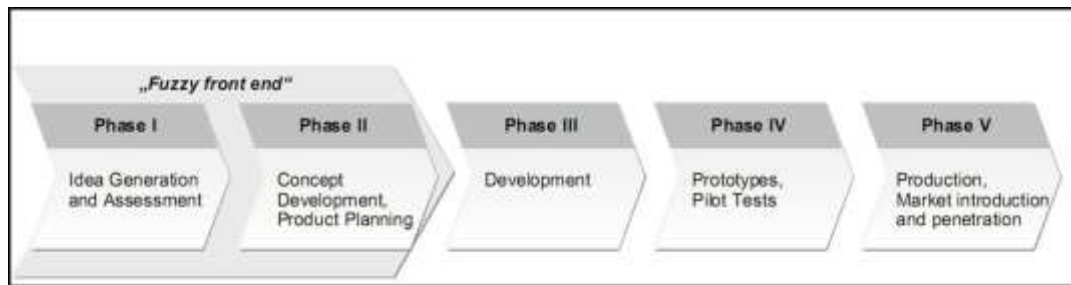
studies into new product performance reviewed

Figure1.1"Fuzzy Front End"of the NPD Process

1.1 ConsumerResearchLacksCredibility

A widespread belief among practitioners is that consumers cannot be trusted in their opinion. Several studies have shown that it is difficult to predict final consumer behavior based on consumers' expressed attitudes towards products or certain issues. That users of NPD methods mention this shortcoming of forecast inaccuracies. Moreover, users mention as well that, methods are not able to capture the complexity of the market place. Another problem that plays in NPD is that consumer research is often part of marketers' responsibility in a company. It is well known that both marketing R&D professionals do notal ways consider each other's information to be credible. Marketers are often viewed as 'easy talkers' by R&D personnel, as relying too much on intuition rather than on hard facts. If people perceive information as less credible, it means that they perceive the quality to be lower, and this will result in lower information utilisation.

1.2 Consumer Research does not Help

Come up with Innovative New Product Ideas Various studies have found that the key determinant of new product failure is an absence of innovativeness - the extent to which a new product provides meaningful unique benefits. Not much confidence, however, exists among product developers that consumer research can provide a valuable contribution in the search for new and improved ways of satisfying consumers' needs. Although it is generally believed that listening to VoC is important, the precise way of' listening' is not always clear. Effective use of consumer research for this purpose has been identified as a problematic area, because it is unsure what to ask consumers. An often-heard argument is that asking consumers what they want is useless, because they might not know what they want. Moreover, the majority of available methods focus one valuation of products. In these methods, products (ideas) are presented to a sample of consumers and evaluations are collected. The see valuations are used to optimise the product or to screen and select from different product ideas, ultimately ending up with the product idea with the highest like lihoodof market success. However, these methods can be considered as reactive in nature for their use in the early stages. The introduction of new products offers the opportunity for companies to increase its sales and so enhance both competitive position and potential for surviving. Although the development of new products can be rewarding, it is risky as well as has been already mentioned. The central task in NPD is to develop those products (characteristics) that deliver desired benefits for consumers as perceived by them. Unfortunately, this is more easily said than done. Many new products fail when launched in the market place. This is unacceptable from a financial point of view. The reasons for success are well researched and documented. In essence, development of a new product that is both unique and superior requires effective marketing-R&D interfacing throughout the NPD process. Breakthroughs in R&D generally enhance uniqueness whereas marketing/consumer focus will help ensuring periority in consumer value perception.

2. LITERATURE REVIEW& OBJECTIVES

[1] Rothschild D, Wolferset. al (2021) NPD can originate from new technology or new market opportunities .But irrespective of where opportunities originate, when it comes to successful new products it is the consumer who is the ultimate judge. So, in order to develop successful new products, companies should gain a deep understanding. Consumer research can be carried out during each of the basic stages of the NPD process:

[2] Galesic M, Bruineet. al (2020). However research has predominantly focused on the topic of responding effectively to customers' current, expressed needs barring a few exceptions where there is little empirical insight into the nature or effects of pro-actively understanding customers latent and future needs.

[3] Prelec D, Seunget. al (2019) Consumer research, however, helps to raise the odds of success in the market. Even though consumers may not always be able to express their wants, it is important to understand how the products are perceived, how the needs are shaped and influenced and how product choices are made based on them. In this way, it helps to avoid working on a new product that has a low probability of success in the first instance.

[4] Palley AB, Soll JBet. al (2018). Knowledge obtained through formal methods is generally used to a greater extent, most likely through its verifiability and credibility. Unfortunately, despite the large number of available methods and techniques to be used in the NPD process, the majority of them are not used by companies.

[5] Court D, Gillen Bet. al (2018)The failure of methods to reach their full potential is perhaps the result of the limited and confused way in which they have been evaluated and made clear to potential users. In contrast to the significant attention paid to methods like Quality Function.

[6] Luce RD, Tukey JWet. al (2016) Similarly, it is attempted to characterize methods that unlock consumers' needs as either 'need-driven' or 'product-driven'. In need-driven methods, participants are asked to reveal their internal needs, without being exposed to other words, exposure to products is the driving force in product-driven methods and needs are derived from them.

[7] Green P, Srinivasan Vet. al (2017) Deployment and product testing methods, analysis of strengths and weaknesses of consumer research methods for opportunity identification has received only little attention. For example, there have already been several excellent review articles in the area of creativity enhancement

[8] Green P, Srinivasan Vet. al (2017) Product-driven methods provide a restricted view on consumer needs. They provide insights that are limited by the particular product(s) included in the study, that is, they elicit consumer needs within an existing framework of what is already available on the market. On the other hand, reactions to existing products are relatively predictable, and results can easily translated in corresponding product requirements.

[9] A Conjunctiveet. al (2016) In this way a consumer is able to compare two dissimilar alternatives (such as a video cassette recorder and tickets to the movies) on abstract values such as potential for fun and enjoyment. In tasks where products that have to be compared are more similar, concrete and' comparable', attributes like price tend to be more important.

[10] Huber Jet. al (2014) In contrast, when individual products are evaluated, the importance of attributes is influenced by the ease of evaluating each attribute by itself. The reason for this is that consumers do not have well-articulated preferences for the specific level each attribute.

3. Objectives

- The present work proposes an alternative approach to conjoint analysis for estimating the market share of a new product.

- Our method allows estimating the market share even when the number of attributes and levels are large.

- However, as a main difference with respect to conjoint analysis, our approach does not reconstruct utilities neither atthe individual nor at the segment level.

- Instead, it directly estimates the market share.

- This enables us to split the questionnaire among respondents and therefore to reduce the burden on each respondent as much as desired.

- In essence, the proposed method is composed

4. THE VALUE OF CONJOINT ANALYSIS IN CONSUMER RESEARCH

In Conjoint Analysis, respondents indicate their preference for a series of hypothetical multi-attribute alternatives, which are typically displayed as profiles of attributes. The responses to these profiles are analysed to yield estimates of the relative importance of the attributes and to build predictive models of consumer choice for new alternatives. Conjoint Analysis is a dependence technique that has brought new sophistication to the evaluation of objects or ideas (Hair et al., 1998). Utility is a subjective judgement of preference unique to each individual. It is the conceptual basis for measuring value in Conjoint Analysis. It is a measure of overall preference because it encompasses all the features, both tangible and intangible. Utility is assumed to be based on the valueplacedoneachofthelevelsoftheattributesandexpressedinarelationshipreflecting the manner in which the utility is formulated for any combination of attributes. the step by step process that was adopted for initiating thecase study is explained along with the rationale for selecting the options, at everystep. The chapter begins with the overview, of the circumstance of the real-life casestudy followed by the sample size calculation, questionnaire administration and discussion of the data analysis of the primary data. This thesis on Conjoint Analysisis a live study that was conducted at a reputed Indian manufacturing company. It is aB2B product. The customers and consumers were the central players of this case.

5. CONCLUSIONS

Every research study uncovers a lot of relationships that was perhaps not obvious and presents the gaps. Post that the thesis proposes a method to close the gap with a hypothesis. The successful validation of the hypothesis is the culmination of the research. The salient findings of this research and the results obtained by applying Conjoint analysis to product development are asfollows:-

- That consumer research inputs need to be gathered, and considered in a structured manner, for product development. The root causes for the non-use of the consumer research has been understood and the corrective actions to address the root causes, have been developed and deployed, successfully.

6. FUTUREWORK

- Conjoint analysis could be applied to B2C products. The case was fora B2Bproduct.

- Conjoint analysis could be coupled with design softwares like ANSYS, CATIA and ProE so that, the strength of material, computational fluid dynamics and other simulations could also be visualized by the product developer, during the design phase for objective decision process.

- Conjoint analysis could be applied using more than 2 levels and morethan5attributes, and the challenges and results could be studied.

- Conjoint analysis could be applied for services to create customer focused packages.

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