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Decision Making on Optimal Selection of Advertising Agencies using Machine Learning

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Abstract:

The decision makers of every business firm take strenuous efforts to achieve the target of sales promotion using different marketing strategies. In recent times, advertising is becoming one of the most preferred and adopted marketing techniques to reach customers at larger magnitude. The business firms irrespective of their production sizes and scales associate with various advertising agencies to familiarize their products to the customers. The advertising strategic approach of marketing also gives rise to a decision-making problem on the optimal choice of advertising agencies as the wrong selection of the agencies harms the sales. This research paper intends to propose a decision making (DM) model integrating both multi-criteria decision methods and machine learning algorithms to make optimal selection of advertising agencies. The proposed DM model considers 25 alternatives of advertising agencies, six criteria, linguistic analytic hierarchy process (LAHP) and random forest algorithm for ranking the advertising agencies. The machine learning (ML) algorithm identifies the feasible alternatives with the help of criterion weights obtained using the method of LAHP. This method is more compatible as it minimizes the risks of decision making by grouping the alternatives into two groups of acceptance and rejection based on their likelihood. The computations are done using Python programming language especially in Google Colabs.

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I. Introduction

The bountiful competitions prevailing in the existing world of business have elicited the decision makers of every business firm to stick on to the most influential marketing strategies of advertising. Advertisements are the most powerful weapons that influence the behavioral patterns of product consumption [1]. They are also characterized as a double-edged sword because they sometimes persuade and dissuade product sales. The literature defines advertising as a means of gaining the attention of the public through paid services and primarily used as a tool for promotion. In business view, advertising is termed as a composition of varied information about the product and it is expected to be presented more appealingly. Advertisements are used as a means of sales stimulation, customer acquisition and brand conservation [2]. The designing of advertisements must be tactful and effective as misappropriations cause huge loss to both the sales and customer loyalty. Advertising is of different types and the most significant of them are print, broadcast, outdoor, covert and public service. As almost all the business firms have indulged in advertising their products and services, they employ either of the advertising types or a combination of it through advertising agencies. An advertising agency is an independent company or organization, consisting of a creative workforce to **Sign effect Details a Reading** with the business firm to increase sales promotion of the product [3]. There are several functions that an advertising agency performs to accelerate profit. Advertising is more essential in present days to a business firm especially at times of launching a new product, augmenting customers, communicating the product. The business firms though can perform such means of advertising on their own still prefer advertising agencies as the latter possess the attributes of professionalism, optimum and decentralized approach. The five/different types of advertising agencies are full-service agencies, interactive agencies, creative boutiques, media-buying agencies and in-house agencies. As quite a large number of advertising agencies of each type are mushroomed, the business firm shall make a suitable choice of the agencies for making advertisements using decision - making methods. Decision-making is a systematic process consisting of alternatives and criteria. The objective of every decision-making process is to rank the alternative, based on the selected criteria using compatible methods of multi-criteria decision-making (MCDM). In general, MCDM methods are used to find the criterion weight and to rank the alternatives. There are several MCDM methods available in the literature. Some of the preferred methods are presented in Table I.

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