Marketing Engineering as a Progressive Platform for Optimizing Managerial Decision-making Processes in the Context of Current Challenges of Marketing Management

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Abstract. Marketing engineering is nowadays considered as a progressive platform for optimizing managerial decision-making process in the context of current challenges of marketing management. Unfortunately, the practice shows that quantitative basis of this approach forms a barrier of its implementation in managerial processes traditionally based on mostly qualitative analytical apparatus. Thus, the aim of this paper is to summarize basic methodological apparatus of marketing engineering in the context of current challenges of marketing management. To achieve this, the method of literature excretion is used. It is stated that traditional econometric models have potential to be used also in scope of marketing analytics. By doing this, wide platform for erudite managerial decision making is created.

Introduction

Marketing is a comprehensive system combining traditional economic postulates and practices in the introjection of psychological and sociological characteristics of consumer. Historically, it is characterized by paradigmatic polarization, in which theories alternate by differently accentuating the need for econometric modelling as a baseline platform for optimizing managerial decision-making processes. Individual complicated structures of the intersection of its qualitative and quantitative aspects require not only specific professional and personal prerequisites of decision-making managers at individual management levels, but also a developed supporting instrumentation of these processes. Marketing engineering is a progressive platform for optimizing managerial decision-making processes based on the use of computer-aided modelling.

Literature Review

Exact quantitative argumentation based on A. Comt's, M. Weber's and in part A. Schopenhauer's positivist theory emphasizing the statement of facts given through phenomena, their subsequent arrangement according to observed patterns and the final prediction of future phenomena, has gradually become a relic in modern economic science. This is also stated by the fact that the Nobel Prize in Economics in 2017 was awarded to Richard H. Thaler, who is involved in researching the psychological factors behind the economic decision-making of individuals. The basic premise of his research is the (i) rationality of the behaviour of individuals on the market as a result of their limited cognitive abilities and volition, which, moreover, vary across individual personality profiles. [1] Thaler rejects in his theory the traditional economic models created on the basis of simplified assumptions of perfect rationality constituting the essence of Homo Oeconomicus. [2] This simplification has allowed economists to develop strong, predominantly neoclassical economic models, but these have experienced an increasing number of exceptions to their historically proclaimed universal validity in confrontation to current economic environment.
Due to the concept of behavioural economics rejecting the traditional neoclassical concept of rationalizing the economic behaviour of market players, developments in marketing analytics have also deviated from its mathematical-statistical basis. [3] However, abstracting away from the quantitative platform of qualified decision-making for marketing managers has also not produced satisfactory results in the context of the current challenges of marketing management. [4] By this we mean, in particular, increasing competition in the distribution of consumer goods, accelerating dynamics of strategic business partnerships, significantly shortening of the life cycles of both products and businesses, the information revolution caused by the rapid development of digital technologies, increasing number of product portfolio modifications and fragmentation of markets and media, which reduces the effectiveness of implemented communication strategies. [5]

However, the dynamics of the development of knowledge assume that the shortcomings of the behaviourally oriented approach will not be amend by simple substitution with originally unproven quantitative analytics models. This creates space for the implementation of modified econometric models taking into account those endogenous and exogenous factors from which it has been abstracted so far. They are dominated primarily by 1) Platonic approach to argumentation and 2) abstracting from extreme values as immanent components of surveyed statistical files and phenomena. Platonic approach to argumentation consists in focussing on explicitly defined contents and ideas of their functional mechanisms. This naturally tends to favour of existing intellectual maps and thinking constructs at the expense of pro-innovative, creative and unconventional solutions conforming to market dynamics. Abstracting from extreme values makes it impossible to explore phenomena in their entirety, and concentrates only to the extent that corresponds to Gaussian normal distribution of values.

However, for the sake of a true understanding of the phenomenon, it is necessary to realize that it is the extreme values and cases that play a key role in the context of taking competent management decisions. Any ex-post descriptive analyses as well as ex-ante predictive analyses carried out in the light of these phenomena have given rise to discussions on their applicability in the context of the current challenges of marketing management. Among them, the phenomenon of the black swan is dominant, which confronts hitherto created concepts of marketing management with the reality of uncertainty in economic environment. [6] This creates space for building a relevant theoretical basis for optimizing of the decision-making processes of marketing managers based on the growing need to create a comprehensive methodology for implementing marketing engineering into managerial decision-making processes at the various levels of marketing management. The methodology, based on the needs of the practice, will be based on current theoretical knowledge and practical experience in the research area. Following this, a space for creating new knowledge and postulates forming the basic prerequisite for achieving sustainable development will be created on the basis of a systemic and multidisciplinary approach.

Basic Methodological Apparatus of Marketing Engineering

Traditionally, quantitative methods in marketing analytics are used in order to streamline the decision-making of marketing managers and eliminate the shortcomings of qualitatively designed instrumentation for optimizing decision-making processes. [7] However, the large amount of available data and information, as well as the broad portfolio of their usability, requires a revision of the applied methods in order to optimally exploit their informative value emphasis on increasing the dynamics of their evaluation and interpretation while guaranteeing their gnomic relevance. This is possible only with the use of existing software tools as a basic platform for the application of the marketing engineering concept. Currently, the most used programs are Nielsen Answers, MML-TGI and Data Analyzer respectively add-in model Marketing Engineering for MS Excel. Regardless of the specific program ambient chosen, it is necessary to apply appropriate scientific methods, the selection of which should reflect the current state and trends in the field of marketing research and marketing analytics. [8,9,10,11]
In addition to traditional research methods, such as observation, querying and experiment, the following mathematical and statistical appropriate scientific methods should be prospectively used in the context of fundamental decision-making processes at various levels of marketing management [12]:

Segmentation, targeting and positioning:

- **Segmentation**—discriminatory and burst multivariate statistical analysis. [13] These methods are designed for the classification of realized observations into two or more groups, while the fineness of the chosen division depends on both the goal of the analysis and the structure of available data.
  - **Targeting**—multi-criteria decision problem with several possible calculation principles. The basic method is the TOPSIS method based on minimizing the distance from the ideal variant. [14] Another suitable method is the so-called a method of analytical hierarchical process that is computationally based on maximizing of utility. [15] The other method is the PROMETHEE I and II method, which consists in evaluation based on preferential relations. [16] By relation we mean the relationship between variants, mostly the relationship of preference, indifference and incomparability.
  - **Positioning**—the basic analytical tool is the so-called perceptual maps, which are a graphical representation of consumer perception and preferences of different entities to the map in the so-called Euclidean space of coordinates respectively GAIA method, which is one of the methods of graphical solution of multi-criteria variant evaluation problems. [17]

- **Creating marketing budgets** that should be based on optimizing of profitability function. A suitable tool is the so-called The ADBUDG model, which also uses qualified managerial judgment regarding the development of market share in four different predefined scenarios as input. [18]

- **Analysis of value of customer** quantifying the value of the customer for the company in the long run, which can be defined as the sum of discounted future revenues associated with the current customer base and market conditions based on stochastic modelling using Markov chains. [19]

- **Portfolio analysis**, which in the context of marketing is traditionally carried out through BCG, GE and the so-called Ansoff matrix. However, it is possible to apply the analytical instrumentation of the financial portfolio to it. [20]

However, in the context of marketing engineering, a wide space is created for the implementation of such tools of econometric instrumentation, which have not yet been used in the optimization of managerial decision-making processes in the context of current marketing management challenges. These are mainly expert methods of risk identification [21,22]; simple and multidimensional linear regression [23,24]; hedonic regression [25,26]; survival analysis, Kaplan-Meier analysis and Cox regression [27,28]; discrete choice analysis in the form of Logit and Probit models [10]; conjoint analysis [29,30] respectively data envelopment analysis (DEA) [31].

**Summary**

The aim of this paper is to summarize basic methodological apparatus of marketing engineering in the context of current challenges of marketing management. By applying the method of literature excerption, it is stated that traditional econometric models have potential to be used also in scope of marketing analytics. Thus, traditional managerial decision making processes such as 1) segmentation, targeting, positioning; 2) customer lifetime value as well as 3) portfolio analysis are presented in scope of potential usage of econometric apparatus—TOPSIS method, method of analytical hierarchical process, PROMETHEE I and II method, GAIA method, ADBUDG model, Markov chains, methods of risk identification, simple and multidimensional linear regression, hedonic
regression, survival analysis, Kaplan-Meier analysis and Cox regression, discrete choice analysis in the form of Logit and Probit models, conjoint analysis respectively data envelopment analysis (DEA). By doing this, wide platform for erudite managerial decision making is created and theoretical shift towards long term sustainable development based on effective marketing management is made.

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