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K. Sridhar Moorthy's Theoretical Modelling in Marketing - A Review

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Abstract

Modelling has become a visible tool in many disciplines including marketing and several marketing models have been constructed. These models serve their pedagogical and practical purposes in some

cases. However, among the marketing models so often cited is Moorthy's Theoretical Modelling in Marketing. This model is important, and hence this review once more, in that it offers a starting point, and in some cases the finishing line, for those who want to tread the pedestrian of modelling in marketing. But this is not the end; it also provides an explanation for those who want to know more about modelling in general by providing answers to some basic questions about the use of models. Our discussion here will certainly bring in many people who have been peeping into marketing modelling from behind the wall.

Key words: Marketing, Modelling, Moorthy, Pedagogy, Theoretical

Introduction

K. Sridhar Moorthy is indeed a marketing modelling guru whose works have been cited by over 1730 authors (www.academicsearch.com). He is the Manny Rotman Professor of Marketing Rotman School of Management at the University of Toronto, Canada.

The presentation of Theoretical Modelling in Marketing speaks volume of the author's expertise in marketing modelling and his 2 x 2 experimental design for theoretical modelling of sales force compensation is vivid and illustrative of a marketing environment as captured from a theoretical lens.

What is a model? This question may seem not apt to this discussion but the next line will soon explain the reason this question must be answered. Bass (2004) puts the answer in the simplest and clearest term – models are abstractions and simplification of reality. Useful models capture the essence of reality in a way that enhances understanding of phenomena.

Thus Moorthy begins his discussion by first paving a way for the reader to come on board the marketing modelling excursion train. He assumes a neophyte readership (which he referred to as

nonparticipant) and so draws a line between theoretical modelling and the qualitative models of the decision support system (DSS).

Overview

In the overview the author takes the reader round the construction site of theoretical modelling (the environment) and introduces him or her to the building elements of the theory (assumptions). The reader is not left in doubt about the conceptual difference of assumptions in theoretical modelling and DSS and behavioural marketing research: "These assumptions, clearly, do not describe real world markets. At best they define an artificial world with some connections to the real world. Thus the concept of a model in theoretical modelling is different from the concept of a model in decision support systems and behavioural marketing research." Also clarifying the position of theoretical modelling, the Author states: "Theoretical modelling also resembles meta-analysis in some ways … Both involve 'post model' analyses, but meta-analysis is used to discover the patterns in empirical results across a number of situations, whereas theoretical modelling's purpose is to construct cause-effect explanations of marketing phenomena."

A Case study

Using the agency theory explanation of sales force compensation practices, Moorthy takes the reader through construction of a supermodel (or a universal model) which houses sub models. The basic ingredients of the supermodels are the six assumptions from which, in running an experiment, four sub models were constructed. Of interest is the fact stated that the "assumptions have substantive and mathematical components. The distinction between the two is that the former are verifiable empirically (in principle), whereas the latter are not" and that "It is the substantive assumptions that define the marketing environment." Based on his six assumptions, the following four sub models were constructed:

Model 1 – Salespeople are risk-neutral and their effort is observable.

Model 2 – Salespeople are risk averse (that is avoiders) and their effort is observable.

Model 3 – Salespeople are risk-neutral and their effort is not observable.

Model 4 – Salespeople are risk averse and their effort is not observable.

The above four sub-models represent a close-to-real-world scenario but only sub model 4 appears real as demonstrated using his 2 x 2 experimental matrix for theoretical modelling of sales force compensation.

The question here is why use all these modelling when the assumptions of the supermodels may not hold out in real world? Eliashberg and Lilien (1993) concur with Moorthy that "there are essentially three purposes for modelling in marketing: measurement, decision-making and theory-building" which they call 'measurement models, decision-making models and stylized theoretical models respectively". They went further to state that "the concept of a model in a stylized theoretical fashion is different from the concept of a decision-making model. A decision-making model is defined as a 'mathematical description of how something works' and it often takes the point of one particular interested party. A stylized theoretical model is simply a setting – a subset of the real-world in which 'the action takes place'. It often takes the view point of an outside (objective) party." Thus Moorthy agrees with Eliashberg and Lilien by stating that "The main purpose of theoretical modelling is pedagogy – teaching us how the real world works. That purpose is always served by internally valid theoretical experiments." Incidentally Moorthy's modelling falls within these stylized theoretical models.

If the theoretical models only tell us how the real world works and not how to use them to work in the real world, then how does the marketing manager benefit from such theoretical models? Before we go back to Moorthy's 2 x 2 matrix to see how the marketing manager

fits into the box let us take the question further. What about the practical use of such works for marketing managers? Such models are of direct value to managers when they uncover robust results that are independent of the unobservable features of the decision-making environment. Under these circumstances the models have two uses which Moorthy calls "externally valid results" and says that they act as (1) "as direct qualitative guidance for managerial policy" (in our situation we need low (high) proportions of sales force compensation in commissions) and (2) as the basis for specifying operational models and associated models associated (with) decision-making systems that can adapt the theory to a particular environment and generate quantitative prescriptions" that will form "the basis for decision support system that will 'fine-tune' the theory to the manager's particular decision-making environment and generate quantitative prescriptions."

Moorthy's 2 x 2 full-factorial experimental design is akin to BSG's Growth-Share Matrix. He states that "Comparing the implications of model 1 versus model 2 and model 3 versus model 4, we see that the salesperson's risk preference – whether he or she is risk neutral or not – has a 'main effect' on the optimal compensation plan. With risk neutrality, salaries are not needed, with risk aversion, salaries are needed." In other words, the salespersons 'risk preference has a direct impact on the compensation plan because a plan that offers a risk averse salesperson commission is likely to attract an effort that will not promote the company's gross profit.

Similarly, observability of the salespersons' effort has a main effect on the optimal compensation plan because if the salespersons' work is observable commissions are not needed since the effort can be observed or tractable.

Even though this is a theoretical exposition, it does play out in real life. Many marketing firms in Nigeria today place their salespeople on commission because what the salespersons do in the field cannot be observed, even with the use of targets. And so to make them hit their

targets, salaries – where they are used in place of commissions because of the salespeople's' risk aversion – are prorated according to the percentage of the target met.

Equally of note is Moorthy's comment on interaction effect between risk aversion and observability. And what is this effect – "that lack of observability results in less work if the salesperson is risk averse, but with risk neutrality the observability has no effect on how hard the salesperson works."

Painting a picture of evolving supermodel, the Author uses Holmstrom and Milgrom (1990) to show that because of multidimensional (and sometimes nonmeasurable) nature of output, even under lack of observability, salespeople may be compensated by salary alone (whether they are risk neutrality or not).

Internal and external validity of theoretical models

The essence of internal validity is to establish a cause-effect relationship. Using overview of the theoretical modelling process, Moorthy shows that "if model A is realistic for a given situation, then model B – forced to differ from A in order to establish causality – cannot be." This does not, however, diminish some built-in artificiality of theoretical models which removes them from the realm of realism in decision support models, according to the Author. This is "because decision support models are meant to serve as operational models (and) they tend to be inclusive in their choice of variables and the variables are set at their most realistic levels (whereas) theoretical models tend to exclude variables that are not part of the explanation being proposed."

Usefulness of theoretical modelling

Admitting that the main purpose of theoretical modelling is pedagogy, Coughlan et al (2010) point out that analytical modelling will have to answer the how and why questions to be relevant. These questions the Author tackles by pointing out that the "use of theoretical modelling – and the pre-eminence of internal validity considerations in that use –

is analogous to the theory-testing purpose of empirical experiments. When theory testing, as opposed to application, is the purpose of empirical experiment, internal validity considerations dominate external validity considerations."

But more importantly, Moorthy asked a salient question: Does theoretical modelling have any practical use for managers? The use of the word "practical" should be noted. Earlier we had stated the usefulness of theoretical modelling to marketing managers as shown by the Author and Eliashberg and Lilien (1993), but the application of practicality takes the question to a different level. Moorthy himself provided a concise answer: (1) as direct qualitative guidance for policy and (2) as a basis for decision support system that "will 'fine-tune' the theory to the manager's particular decision-making environment and generate quantitative prescriptions."

Then follows the how question: How does theoretical modelling provide qualitative guidance for managerial policy? The Author has the answer: "helps managers learn about the forces that determine variables. Such knowledge", according to him, "is crucial in deciding how to set those decision variables in a given situation and how to change them if decision-making environment changes."

In the salespeople's compensation plan, for example, there is an industry plan but why should a manager prefer to move away from the run of the mill? The answer lies in knowledge of the theory which helps the managers to design plans that differ from the industry pattern.

Comparison of models

The author's final cruise was comparing theoretical modelling with behavioural theories and decision support models. Comparing theoretical modelling with behavioural theories, he pointed out two areas of divergence: (a) while behavioural theories are in the main verbal reasoning, theoretical modelling is largely mathematical. Thus there is a greater risk of derailing in verbal reasoning because of

imprecise use of or understanding of language which is lacking in mathematical models; (b) while the theoretical modelling and behavioural theories use intuition in theory –building process, the likely occurrence of surprise is greater in theoretical modelling than in behavioural theories building process. The surprise is an unintended occurrence which, though may show up in behavioural theories building process is, nonetheless, less certain; (c) theoretical modelling becomes incapacitated in situations where mathematical modelling cannot capture some phenomenal occurrence which behavioural theories can explain through verbal reasoning.

The author gave examples of these situations as the "framing effects" which "refers to the phenomenon of people solving problems differently depending on how problems set up." The second difficulty of the theoretical modelling is the "procedural rationality" which "refers to the fact that people may not optimize." This, of course, is true because for some reasons people may decide for less than the optimum level whereas mathematical modelling has no room for less than optimum level.

Finally, Moorthy draws a line between theoretical models and decision support models. Decision support models by definition are designed to assist managers make appropriate decisions in their operating environment. He states that the fundamental difference between theoretical modelling and decision support models lie in their objectives. According to him, "The practical objectives of decision support modelling translate to a preference for realistic representation of the manager's decision situation. In contrast to theoretical modelling, there is no need to create unrealistic models because cause-effect inference is not the goal … Therefore, unlike a theoretical modeller, who is trying to create a 'spare' environment by excluding variables, a decision support modeller is trying to capture as much of reality as possible by including variables."

Conclusion

Concluding, Moorthy posits that theoretical modelling has both art and science nature. Logical arguments and experimental application form the basis of its scientific nature while it draws its art-life from the art of choosing the model itself. This paper is rich in its exposition and finds a safe haven in the academic community and the practical world if we agree that theory and practice build on each other.

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