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Multivariate statistics in industrial marketing management: A practitioner tool kit

Agnes Nairn[a,*], Laurence Ede[b,1], Pete Naudé[a,2]

[a]*School of Management, University of Bath, Claverton Down, Bath BA2 7AY, UK*
[b]*Tocris Cookson, North Point, Fourth Way, Avonmouth, Bristol BS11 8TA, UK*

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Abstract

Much published work over the years has pointed to the differences between business-to-consumer (B2C) and business-to-business (B2B) marketing. An undesirable by-product of this sometimes misdirected distinction is that managers working within B2B environments have generally not considered the use of what are seen as B2C techniques, such as multivariate statistical analysis. This article is structured in three parts. First, the argument for the similarities between B2B and B2C marketing is developed; second, three different multivariate statistical techniques are presented and combined to form a practical tool kit for use by B2B managers on strategic, operational, and tactical levels; and third, the results of an application of the techniques in the life science research chemicals industry is reported, demonstrating that the tool kit substantially enhanced managerial understanding of customer decision processes.

Keywords: Multivariate statistics; Practitioner marketing; Life science

1. Introduction

As any perusal of the appropriate journals indicates, the use of quantitative methodologies in business-to-consumer (B2C) marketing has been widespread for decades, while business-to-business (B2B) marketing has not embraced these techniques to the same extent. This is in part because of the assumption that B2B marketing is fundamentally different from B2C and the resultant reluctance to ''borrow'' B2C techniques. We argue that in many industries there is much to be gained by accepting the similarities in the two disciplines and thereby considering some of the multivariate techniques developed to enhance consumer understanding. This article shows how a tool kit of multivariate statistical techniques can be used together to give B2B marketers a competitive edge on three levels: strategically, operationally, and tactically.

The tool kit discussed here consists of conjoint analysis, cluster analysis, and correspondence analysis. Conjoint analysis illuminates complex decision-making processes in multiproduct, multisupplier contexts and can thus be used to inform overall marketing strategy; cluster analysis, which segments buyers into groups with similar needs, enlightens operational resource allocation decisions; and correspondence analysis, which displays cluster information in two-dimensional space, can produce a visual aid useful for tactical sales training.

We have structured this article as follows: firstly, we briefly review the debate on similarities and differences between B2B and B2C marketing; we then discuss the mechanics and applications of each of the three multivariate statistical techniques separately and together; finally, we demonstrate how the tool kit has been successfully applied strategically, operationally, and tactically in the life sciences industry.

2. B2B and B2C marketing: the same or different?

In a management context, buyer behaviour is typically not considered as a single area of study but as two distinct

* Corresponding author. Tel.: +44-1225-386202; fax: +44-1225-323902.
E-mail addresses: mnsacn@management.bath.ac.uk (A. Nairn), lede@tocris.co.uk (L. Ede), mnspn@management.bath.ac.uk (P. Naudé).
[1] Tel.: +33-1179-826551.
[2] Tel.: +44-1225-386202.

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subsets, consumer buyer behaviour and organisational buyer behaviour (Fern & Brown, 1984). This distinction results from the perceived differences between consumer and industrial markets suggested by many textbooks (Kotler, 2003; Wilson, 2000).

The fact that the differences have been promulgated for over a quarter of a century has almost certainly had an impact on the lack of inclination to use statistical techniques in organisational marketing. Three factors may have contributed to this phenomenon. First, many statistical techniques and principles are based on the central limit theorem, whereby many sampling units are all assumed to be of equal importance. With many B2B markets typically composed of a few buyers varying radically in their importance to the seller, it is easy to see why the relevance of statistics might not be immediately apparent. Second, if the relationship between organisational buyer and seller is assumed to be close—even personal—then the significance of impersonal mathematical aids is not obvious. Third, if the buying process in organisations is influenced by several parties, and if at least some of these are trained professionals, then the application of tools designed to understand individual decision-making psychology may seem quite inappropriate.

However, several writers have questioned the validity of the B2B–B2C distinction. Shaw, Giglierano, and Kallis (1989), for instance, observe that organisational buyers and consumers are in fact the same set of people only in different buying situations. They go on to ask, "Are we to believe that an executive makes business buying decisions based on quantifiable product characteristics and yet makes personal buying decisions based on intangibles?" (p. 45). Wilson (2000) poses the question, "Why should we assume that separate theories are necessary to explain the exchange behaviour adopted by the same individual when placed in different contexts?" (pp. 780–781), concluding that "it is debatable whether or not the surviving differences between organizational and consumer marketing constitute a sufficient or worthwhile basis for continuing a distinction at a theoretical level" (pp. 794). Concurring views are advanced by Foxall (1981), who writes "Industrial buying behaviour differs from that of final consumers not so much in kind as in degree. The stages, which comprise the respective decision sequences, are broadly similar" (pp. 135), and by Brown (1984), who contends that "practical experience and considerable research tell us that many of the individual/subjective influences [that shape consumer buyer behaviour] are also evident in organizational purchasing situations" (pp. 12). Furthermore, these views are not restricted to a belief that consumer and organisational buying are *broadly* similar but that *specific* elements of consumer and organisational buyer behaviour are also comparable. For example, Shipley and Howard (1993) consider only one aspect of organisational buyer behaviour, the impact of branding, but conclude that its application in the contexts of consumer and organisational buying behaviour is similar.

The central thesis underlying these views is that the two concepts of consumer and organisational buyer behaviour represent "extreme examples" rather than normative, generalisable models, which "although they do exist, tend to obscure the more basic similarities between industrial and consumer marketing" (Fern & Brown, 1984). We propose, in agreement with Fern and Brown, that buyer behaviour be viewed not in terms of these two extremes but rather as a continuum against which any of the theories of buyer behaviour may be more or less applicable.

3. When can multivariate statistics be applied?

If we accept that organisational buying behaviour is different from consumer buying behaviour in degree rather in form, then it is important to ascertain in which organisational buying contexts it is appropriate to use multivariate statistics that have ostensibly been designed to measure facets of individual decision making. Sheth (1973) provides a useful framework in his assertion that "organizational buyer behaviour consists of three distinct aspects. The first aspect is the psychological world of the individuals involved in organizational buying decisions. The second aspect relates to the conditions that precipitate joint decisions among these individuals. The final aspect is the process of joint decision making with the inevitable conflict among the decision makers and its resolution by resorting to a variety of tactics" (pp. 52). Much of the industrial marketing literature is devoted to the second two aspects of Sheth's framework (e.g., Choffray & Lilien, 1980; Morris, Berthon, & Pitt, 1999; Pettigrew, 1975). While multivariate techniques have occasionally been used to enlighten such contexts (e.g., Lockett & Naudé, 1991), it is an understanding of the first of Sheth's aspects (i.e., "the psychological world of the individuals involved in organisational buying decisions,") which can be enhanced by the statistical tool kit discussed in this article. The introduction of such tools into the industrial marketing literature may encourage a new stream of research into the process of individual decision making within the firm—an area that has been somewhat neglected, perhaps for want of suitable techniques.

Another model, which may aid managerial decisions as to the appropriate contexts for using statistical techniques, is the buygrid model developed by Robinson, Faris, and Wind (1967). They argue that organisational buyer behaviour varies according to the buying situation, which may be classed as "new task," "modified rebuy," or "straight rebuy". It is more likely that decision making at the new task stage will encompass Sheth's joint decision making and conflict resolution contexts as more risk is involved, while the straight rebuy stage is most likely to comprise individual decision making. Most buying tasks fall into this latter category, but more effort is expended on understanding the more complex intricacies of coalition decision making on new and therefore more highly involving purchase