Decision States and Information Acceleration

Cam Rungie, University of South Australia,

Mark Morrison, Carles Sturt University,

David Waller Paul Wang and Jordan Louviere,
University of Technology, Sydney,

Harmen Oppewal, Monash University,

Timothy Devinney, Australian Graduate School of Management,

Tim Coltman, University of Wollongong

Abstract

This paper outlines an approach to information acceleration modeling that allows for more accurate and simpler assessment of the role of context and information on choices made by decision makers, including customers. Using rich multimedia and nested discrete choice modeling experiments we are able to assess the direct and mediating effects of information (e.g., advertising, word of mouth, product presentation, etc.) and context (e.g., number of products, technology development, dominant design, etc.); both of which are critical to assessing not only the decision state in which a consumer may reside but also what triggers transition between decisions states.

Keywords: Information Acceleration, Demand Forecasting, Choice Experiments

Introduction

Market Research and Information Acceleration

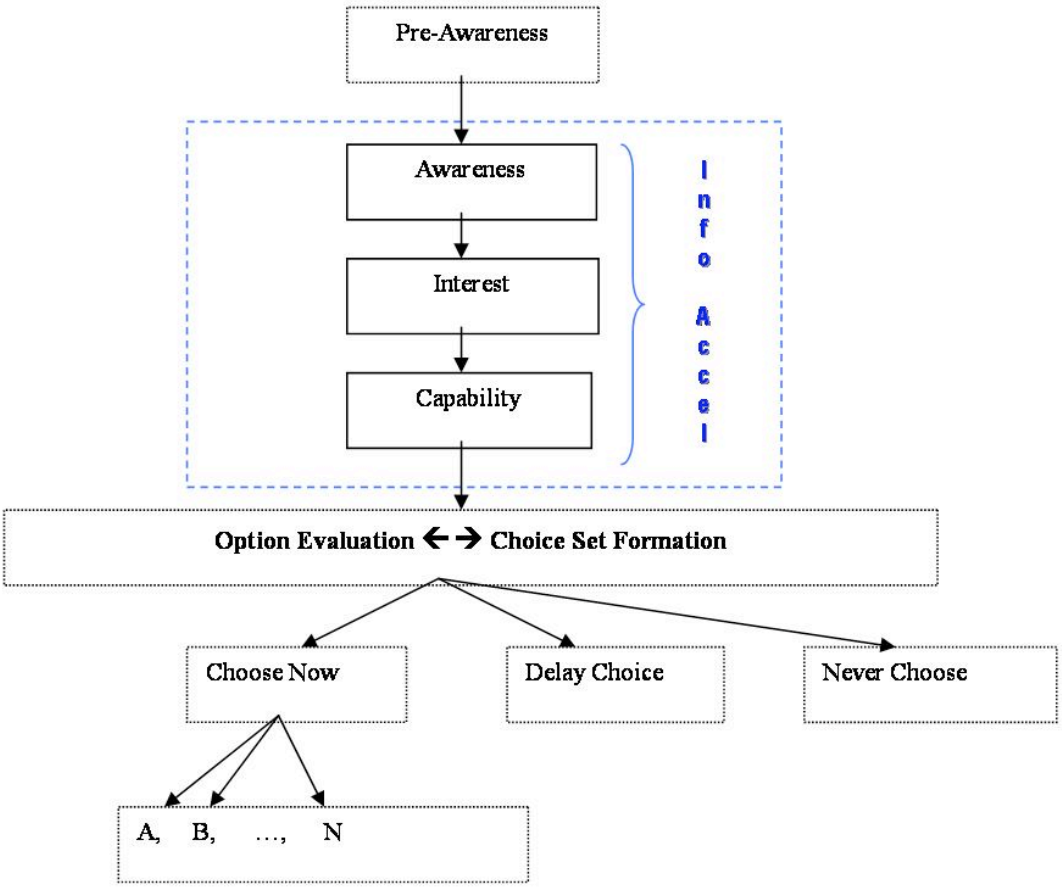
Traditional market research techniques suffer from a number of obvious limitations that are typically a combination of a lack of realism with respect to purchase situations and market context and the expense associated with dealing with such limitations. The holy grail of market research techniques is to find an approach that this sufficiently robust to allow for consumers to reveal realistic behaviour in a simulated and cost effective (to the researcher) environment. To date we have traded off realism and cost and hoped that it did not introduce too great a degree of bias in the results.

The artificiality of market research techniques has been addressed by doing in store manipulations and setting up simulated and virtual on-line stores. These approaches work for environments where product and context are understood. However, for many products—particularly those of the more radical variety and representing future technologies—these techniques are inappropriate as context is unlikely to be understood and consumers lack sufficient knowledge to make representative decisions. Beginning in the early

1990s a team of MIT researchers began using a technique called 'information acceleration' (IA). IA was meant to accelerate customers through the learning phase of purchase decision making rapidly. The central proposition is that if marketers can provide consumers with sufficient information to enable them to realistically experience a future state (when they will be required to evaluate a new product's utility), then preferences, purchase intentions, and information usage data can be reliably collected and modeled to forecast sales, product design and marketing programs.

Most applications of IA combine multimedia representations with statistical design techniques such as stated preference discrete choice modeling (DCM). This allows researchers to move consumers through a process of information acquisition and experience in ways that alter their decision state. These changes to a consumer's decision state vary by virtue of: (1) their awareness of product alternatives, (2) their personal interest in the new product, and (3) their capability to appreciate the new product value on offer. This dynamic approach to consumer choice is far more realistic than many of the popular techniques employed by marketing researchers. After each major information exposure, respondents are then required to choose between choice sets that are systematically varied in terms of strategic options (products, services, job offers, etc.) and attributes (price, color, length of contract). Figure 1 provides a graphical representation of the process.

Figure 1. Consumer Decision States



Although this technique has had commercial success, the literature is quite small and few published studies exist that validate the theoretical concepts underlying IA. The key papers in this area are by Urban and his coauthors (1994; 1997) where multimedia stimuli based on IA has been used to forecast sales on eight new products. Several tests of internal and external validity carried out by these authors have been reported. For example, no significant difference was found between the time consumers spent evaluating a new two-seater Buick sports car (the Buick Reatta convertible) in a simulated environment and in a physical showroom. This example indicates that IA and multimedia simulations can portray information sources with a high degree of realism and are sufficiently sensitive to detect differences in automobile type. When used to evaluate a new medical instrument, Urban *et al*. (1997) found that multimedia computer simulations were not only comparable to actual conditions but that they actually portrayed information sources with a higher degree of realism. The general conclusion arising from this work is that IA is surprisingly good at reflecting reality.

However, the theory of IA is relatively new and few studies have been reported since Urban *et al's.* (1997) paper. Various cognitive and psychometric properties still need to be evaluated for reliability and adjustments to the methodology need to be tested for improved performance. Five issues are worthy of further discussion and we combine our understanding of the literature and our own experience in applying IA to shed further light on this technique.

The High Costs of Information Acceleration Experiments

IA has traditionally been expensive. For example, the capital commitments required by the Urban *et al.* studies ranged from $100 million to $1 billion. The direct implication of this is that management is often forced to make a number of trade-offs between the experimental design that would provide the cleanest, most scientific estimate and the experimental design that can be cost-justified. As a result, forecasts tend to rely on a limited number of future predictions and researchers are often left to untangle business complexity in an effort to reduce the cost of implementation. This raises obvious questions regarding the ability of academics to untangle business complexity. However, recent multimedia advances such Macromedia Flash and plug-in/control technology, have reduced the costs of IA simulations considerably. This enables researchers to be more liberal in their use of interactive media and managers can be more adventurous when testing radically new future scenarios.

Information Simulations

Prior to and during product launch, consumers are bombarded with various types of information. Advertising (magazine, newspaper, television), pier reports (close friends, media personalities), reports (trade articles and newsstand publications) and various other information sources all play a role in developing our awareness and interest in a new product or service. On the basis of qualitative consumer interviews, prior academic research and our own experience working across a number of different industries, we have found the most salient information conditions to be fairly generic. These generic information conditions combine descriptive information (e.g., product glossary and simulated displays of the working product) with indirect or secondhand information (e.g., information obtained from mass-media communications or pier testimonials). Further work however is required to test the validity of firsthand and secondhand information conditions in different market and business

contexts, because consumers often trust what they see and hear with their own eyes and ears more than what they hear from others (Kardes 1999).

User Information Search Patterns

In practice, considerable time and effort needs to be invested by consumers if they are to visit all possible information sources. Hence, in the real world, consumers make conscious decisions regarding the size of the benefit that is likely to result from information search activities and as a consequence, consumers often do not visit all information sources. In the IA environment the cost of visiting a source of information is much less than in a real decision environment. This creates an artificial situation that needs to be overcome and researchers must continually adjust the amount of time available, so that respondents visit roughly the same information sources as they would in a real setting. Although, this aspect of the methodology is subjective, we can control against these problems. Modern database technologies used to host experimental designs provide time stamped data that can be used to track the time respondents spend visiting each information source. While the use of these techniques can protect forecasts from gross error, there is certainly room for further development in this area.

User experience

Simulated experience has proven to be sufficient in cases where customers are required to evaluate new cameras or pay TV packages (Urban *et al.* 1997; Almquist *et al*. 2003). In each of these cases, customer choice is fairly straight forward, as they have some experience and knowledge of cameras and broadcast media. Even in the case of radically new products like an electric car the researchers were able to successfully combine a simulated showroom with a drivable prototype, to allow respondents to experience some of the electric car's attributes (Urban *et al.* 1997). However, some products require more extensive levels of consumer experience. Indeed many service situations cannot be appreciated until the customer has fully consumed the service. Only after the service has been completed—a process that could take weeks or months—can the respondent accurately evaluate its usefulness. Whenever researchers are required to take account the way a product is used or a service consumed, it is preferable to utilize real prototypes or suitable control products to minimize risk and enhance the usefulness of IA.

The issues described above imply that IA is no silver bullet. However, despite these challenges, the technique has proven that it can yield more meaningful forecasts and it does enable marketers to understand the potential impact of different marketing strategies. By using IA to compare informed with uniformed responses, researchers can better understand the dynamic nature of consumer demand and more effectively estimate the marketing effort that will be needed to increase awareness, interest and take-up capability.

Dynamic market evolution

IA experiments have, to date, only generated point estimates of steady state demand. It can be argued that what is most important for new products is not the stationary future demand, but the path of demand over time. What this requires is nested experiments where context changes and, with it, the appropriateness of past information. From a macro marketing

perspective, the issue of competing standards might be important it would be critical for firms to understand exactly what damage or benefit is received from having multiple formats for a single technology (e.g., Beta/VHS, multiple DVD formats, different OS for computers or handhelds). From a micro marketing perspective firms could want to know when to introduce versions of product (e.g., to seed a market) or whether to introduce a blocking/flanking product to slow down a competitor or the extent to which complementary features in a product are relevant to demand (e.g., software for mobile devices).

Discussion and Conclusion

The benefit of IA is to allow for more robust and realistic simulation of customer experience. Because IA relies on DCM approaches it presents a quick way of examining trade-offs. The ability to create alternative 'realities' in which decisions are made allows for the examination of trade-offs between decision states. This is a dramatic improvement on current consideration set research as it presents a direct manipulation within the state rather than inferring what behaviour is like from self reports or inferences from panel data.

The logic of our AI approach is based on the view that the future is a combinatorial problem; that is, there is not one future that we are trying to discover but there are many possible futures & many possible technologies/products that we are trying to understand. Viewed from this perspective most market research techniques are generating 1 or 2 'guesses' about the future. In other words, they have a 'future sample' of only 1 or 2 data points. At a more precise level, we need to understand and model the impact of information, learning and technological evolutions on customer choices. This needs to be done in a context where information has different sources, sources have different credibility, and customers choose/use sources of information differently.

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