

SUPPLEMENTARY INFORMATION S1 (box)

A short tutorial on marketing research methods

Focus groups. Focus groups are widely used in marketing research. Typically, a small number of customers, or potential customers, go into a room with a moderator who asks general questions, observes and keeps the discussion friendly and on-topic. Focus groups are useful for getting ideas about people's preferences and perceptions, but not for actual measurement, as the free-form discussion and the few people involved are not conducive to yield representative numbers. For example, a focus group on hybrid cars may reveal that some people care about mileage and some people care about drive train lifespan, but not how many people care about each or how much they care about these in comparison to other variables, such as price.

Preference questionnaires. The traditional tools used to measure the importance of the product dimensions that were discovered using focus groups (or using other methods) are preference questionnaires. For example, potential hybrid-car buyers may be asked to give a number between 1 and 7 to indicate the importance they assign to dimensions such as mileage and to drive train lifespan. These numerical answers allow marketers to measure trade-offs and to divide customers into segments. But questionnaires have their own problems: different people may use the answer scales differently and the numbers themselves have no clear meaning – even to the respondents. (How often does a car buyer explicitly assign weights to the MPG and drive train lifespan?) Although the first problem may be solved with fancy statistics, the second is a fundamental problem of trying to capture mental processes with numerical scales.

Simulated choice. Instead of asking for customers' preferences outright, simulated choice methods infer them from customers' behaviour. By giving customers descriptions of potential products (or sometimes prototypes of products) to choose from, to sort by preference or to rate, marketers can use statistical techniques like choice modelling or conjoint analysis to parse out the underlying preferences without asking the respondents about their preferences directly. Marketers might ask each customer to sort a stack of cards, each describing a different hybrid car, in decreasing order of preference. If a customer puts a card with (70MPG, 8yr drive train) ahead of one with (60MPG, 9yr drive train), then indirectly he is saying that an extra 1yr drive train is not worth 10MPG less mileage. This indirect measurement reflects the way customers make decisions more closely than questionnaires, but it is still hypothetical and makes customers consider many more options than they would in a real choice. (It is common for a simulated choice to have 30 or more cards, but in reality people tend not to consider 30 different cars.)

Market tests. Market tests remove the hypothetical from the choice: they are used to test the entire marketing mix by introducing the product in limited markets. A hybrid car marketer may choose a few towns where there is a captive market for cars (so not in the suburbs of a large city, for example) and launch their cars there to measure the effect of pricing, promotion, and advertising. Typically at this point the major characteristics of the car can no longer be changed (because when the cars are produced, their MPG and drive train are fixed), so these tests are mostly used to tweak small details and to forecast sales for the larger market (which have implications for production ramp-up). Market tests let firms measure the actual effect of, for example, price and financing options, as the test subjects are spending their own money on actual cars.

When considering different market research techniques, one should also bear in mind that they differ with regard to the time within the product execution process that the information can be provided and used. Ideally, when marketing research information is provided early in the product execution process, it can be used as an input for what path to take when designing a new product or service. In such cases, the product or service is likely to be just an idea, and therefore the only approaches that can be used are ones that do not require any implementation – which means focus groups, surveys, and other methods that are based on

hypothetical responses to hypothetical products and services. When marketing research information is provided later in the product execution process, it is often too late to change some of the features (or bugs) of the product design. In such post-design application marketing research information is often used as input for pricing, promotions discounts, advertising, etc., which are usually intended to increase short-term or long-term sales.

One other important dimension of elicitation methods is their incentive compatibility. In general, economists have eschewed self-report metrics and instead focused on measures of preference that are incentive compatible. In essence, all the economic approaches to measuring preferences are ultimately based on expected utility theory (EUT), which assumes that the choices that individuals make reflect their maximization of the utility they expect to gain¹. For this to occur, the mechanism that elicits these preferences must be incentive compatible, meaning that the main assumption of economics in terms of preference measurement is that individuals only tell the truth when their incentives are to do so. Simple ratings, for example, may not be incentive compatible because there is no consequence for being dishonest (or reward for being honest).

In addition to market tests, which are obviously incentive compatible because people buy real products with real money, other economic approaches have been developed to more efficiently measure preferences. Such approaches usually require individuals to pay from their own money for something that they presumably like. If they don't like it, they won't pay much, if anything. Auction mechanisms are the ultimate example of such mechanisms (for example Vickrey auctions), and related approaches have been developed to measure individual levels of willingness-to-pay (WTP). One such individual-based mechanism is the Becker-DeGroot-Marshak (BDM) procedure, where a respondent submits a bid for a good, a computer then chooses a price from a random distribution, and the comparison of these two numbers determines the outcome of the auction. If the respondent's bid is higher than the computer-generated price, the respondent receives the good and pays the price set by the computer (this feature, which is also the essence of other second-price auctions, is the reason why this procedure is incentive compatible). Such WTP methods have the advantage of generating precise, incentive compatible product ratings. A major disadvantage, however, is that the respondents actually need to have the money to bid, or be endowed with the money, and this approach may therefore not be feasible for testing expensive goods.

1. von Neumann, J. & Morgenstern, O. *Theory of games and economic behavior* (Princeton University Press, Princeton, 1944).