



Explore airlines' brand niches through measuring passengers' repurchase motivation—an application of Rasch measurement

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ABSTRACT

This study develops a method of measuring airline repurchase motivation exploring service items affecting repurchase, and aiding airlines to self-evaluate their service marketing. An empirical study is conducted involving interviewing 1457 repeat patrons of four major airlines that fly between Taipei and Hong Kong. Rasch measurements converting raw ordinal responses into interval scale values was applied to identify the relatively strong and weak service items for each airline.

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1. Introduction

Passenger retention can significantly influence airline profitability (Wong and Chung, 2007). Repeat patrons not only represent a stable source of revenues, but also generate positive word-of-mouth and cost less to maintain as a clientele base (Rust and Zahorik, 1993; Petrick, 2004). As a consequence, retaining customers can become a priority for business operations.

In studies concerning customer retention management, business operations that minimize customer turnover by protecting products and markets from competitive inroads are deemed to have been a “defensive marketing strategy” (Zeithaml and Bitner, 2000). Brand loyalty and customer retention often symbolize the commercial relationship of a long-term association between customer and service provider (Gerpott et al., 2001). Whilst the term “brand loyalty” is extensively discussed in marketing, customer retention itself has rarely been studied.¹ Despite brand loyalty and customer retention possessing a somewhat different focus, in practice they are commonly applied as defensive marketing strategies to retain customers.

Most studies of brand loyalty and customer retention have employed structural equation modeling (SEM) to examine causes and effects between observed variables and their underlying latent constructs. Even though SEM can effectively estimate correlations and offer a measurement model to indicate consistency between manifest variables and latent variables, it is limited

in its analysis to identify the impact of every variable and aid further evaluation.

Here, a method is developed that can simultaneously consider the viewpoints of people and service items. Airlines can then use this method to measure repurchase motivation, explore service characteristics that influence repurchase motivation, and self-evaluate strengths and weaknesses in service marketing.

2. Approach to measuring repeat customer purchase motivation

Repurchase motivation is essentially a behavioral trait that describes an unobservable and immeasurable characteristic, and in psychometrics it is called as “latent trait” (Embretson and Reise, 2000). A direct and positive relationship between customer satisfaction and repurchase motivation is supported by a variety of product and service studies (Selnes, 1998; Hellier et al., 2003). The potential of a customer to repurchase a specific brand can be regarded as a latent trait, generated by the experiences and satisfaction gained from previous consumption.

Every repeat passenger n has a unique repurchase motivation θ_n for an airline. This latent trait could be revealed by answers to those items representing service attributes provided by the airline. Theoretically, a respondent who has high motivation to repurchase the services of a given airline will have higher scores on a larger number of questionnaire items than a respondent with low-repurchase motivation will. The performance of each service item for an airline can be regarded as an inherent resistance against repurchase. It can also be assumed that each service item i has a unique resistance parameter b_i for each airline. The items with lower resistance parameters are those service items, which

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¹ Exceptions include Rust and Zahorik (1993), Colgate et al. (1996), Thorsten and Alexander (1997).

are highly appreciated by customers and will be inherently attractive in inducing repurchase behavior.

The difference between a 'person parameter' (repurchase motivation) θ_n , and the item parameter b_i , will determine customer n 's satisfaction with item i . The responses obtained from the questionnaire will therefore provide a set of information that can be used to establish the relationship between customer satisfaction and the value $\theta_n - b_i$.

Answers to the designed items might not be simple as "yes or no". A well-designed questionnaire should provide the opportunity for respondents to express the degree of agreement to the designed items. Thus, items designed to measure repurchase motivation should be answered with an ordinal scale that has several levels representing possible degree of judgment. A technique is then required to transfer these ordinal responses into interval scales to provide a comparative basis for further statistical inference and discussions.

The Rasch (1980) measurement, that can convert ordinal responses into an interval logit scale, is one approach to measuring respondents' latent trait. The Rasch model assumes that answers to a set of items can be explained by two parameters; the repurchase motivation of a subject (latent trait), and the inherent resistance of the item to being repurchased. Both parameters are located on a linear, one-dimensional continuum.

To simplify we initially consider only dichotomous responses; e.g. "Is this attribute item the dominant reason you are repurchasing the services of this company?" A score of 1 is assigned to the response "yes", while a score of 0 is assigned to the response "no". The probability that a respondent (n) will respond "yes" for item i is expressed as

$$P(1|\theta_n, b_i) = \frac{e^{\theta_n - b_i}}{1 + e^{\theta_n - b_i}} \quad (1)$$

and the probability that the response is "no" is expressed as:

$$P(0|\theta_n, b_i) = 1 - P(1|\theta_n, b_i) = \frac{1}{1 + e^{\theta_n - b_i}} \quad (2)$$

Therefore, the odds ratio that a respondent n can achieve the item i is

$$\frac{P(1|\theta_n, b_i)}{P(0|\theta_n, b_i)} = e^{\theta_n - b_i} \quad (3)$$

giving the logit specification;

$$\ln \frac{P(1|\theta_n, b_i)}{P(0|\theta_n, b_i)} = \theta_n - b_i \quad (4)$$

that isolates the parameters of interest.

In addition to dichotomous responses, the Rasch model can be modified to be applicable to polytomous rating-scale instruments, such as the five-point Likert scale (Andrich, 1978). The modified Rasch model decomposes a polytomous response into several dichotomous responses, and formulates one multinomial-choice problem into several binary-choice problems. That is, it assigns b_{ix} as the value of the item parameter for the rating category x to item i , and assumes that Eq. (1) refers to the probability of subject n responding with rating category x rather than $x-1$ to item i . Thus, we can model the log odds of the probability that a person responds in category x for item i , compared with category $x-1$, as a linear function of the person parameter θ_n and the relative parameter of category x , namely b_{ix} , for item i :

$$\ln \left(\frac{P_{nix}}{P_{ni(x-1)}} \right) = \theta_n - b_{ix} \quad (5)$$

Following Andrich's modification of the Rasch model for a polytomous response, the "rating-scales model" and "partial-credit model" have been widely used for assessing the values of

item and person parameters. The rating-scales model is used for instruments in which the definition of the rating scale is identical for all items, whilst the partial-credit model is employed when the definition of the rating scale differs from one item to another. The partial-credit model differs from the rating-scales model in the possession of its own threshold parameters F_{ix} for each category x (Wright, 1977). This is achieved by a reparameterization of Eq. (5):

$$b_{ix} = b_i + F_{ix} \quad (6)$$

the partial-credit model can be demonstrated as

$$\ln \left(\frac{P_{nix}}{P_{ni(x-1)}} \right) = \theta_n - b_i - F_{ix} \quad (7)$$

The partial-credit model (Masters, 1982) is used for items where credit is given for partially correct answers, there is a hierarchy of cognitive demand on the respondents for each item, each item requires a sequence of tasks to be completed, or there is a batch of ordered response items with individual thresholds for each item. In assessing passenger repurchase motivation θ_n , since one cannot assume the item rating scales are identical, and the partial-credit model is used.

3. Empirical analysis

The Civil Aeronautics Administration of Taiwan estimates that about 8.2 million passengers were carried on 34,854 flights between Taiwan and Hong Kong in 2006. Despite the increasing economic and cultural interaction between Taiwan and China, air passengers are still under certain political restrictions. Aircraft are not allowed to directly connect cities between Taiwan and China; thus, Hong Kong and Macao have become transfer points. This situation provides an opportunity for airlines to profit from the additional travel to and from these cities (Ling et al., 2005) and the link between Taipei and Hong Kong has become one of the world's most profitable routes. To attract business the airlines product differentiate in terms of such things as cabin arrangements, employee trainings, and the meals provided to strengthen customer loyalty.

Oliver (1999) has suggested that customer satisfaction developed by service/product usage is a necessary step in developing loyalty. The "Critical incident technique" (CIT) was applied to determine the events affecting air passengers' satisfaction in service encounters between them and service providers.² Face-to-face interviews and open-ended questions were used to collect, analyze, and screen the events for questionnaire design. Although there is no designated standard for the required sample size when applying CIT, previous studies (Urquhart et al., 2003; Serenko, 2006) have suggested that if the research target and activity are simple and clear then 50–100 observations would be sufficient.

Four major airlines with market shares of 34%, 31%, 14%, and 12% flying between Hong Kong and Taipei were chosen for analysis. Passengers at check-in were asked questions, including: when you used an airline, were there any events they found particularly satisfying or dissatisfying and influenced your decision to continue travelling with the airline and whether they could describe the emotions generated by those encounters, describe the dialogue of the service staff, and whether the encounters satisfied them or not?

During interviews, whilst some respondents had difficulty in recalling their most satisfied or dissatisfied moments, most could provide at least one example of being satisfied or dissatisfied and

² CIT analysis has been used in numerous context, including service management (Chell and Pittaway, 1998; Gremler, 2004), self-service technologies (Meuter et al., 2003), and tourism management (Callan, 1998).

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