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Customer Loyalty as Measure of Competitiveness

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Abstract

Years after the publication of our work on the analysis of customer loyalty concepts (Montinaro & Sciascia, 2011), I still dwell on these aspects, taking up a paper that we did not publish in those years and which attempted to describe an application example of integration.

Market share and relative price are two indicators that businesses often use to measure their market success. In this study we propose to consider an alternative and innovative indicator of innovation success that takes into account the views of clients, true protagonists of the purchase decision making. Customer loyalty is the construct measured in this work that join customer satisfaction and market segmentation. We propose a generalized model where the customer loyalty is a function of customer satisfaction relieved in time and a more complex smoothing model that introduces in the function the influence of the market segmentation adopted by the company. On a simulated dataset are then calculated values of customer loyalty comparing it with a worst case and best case scenarios.

Keywords: market segmentation, customer satisfaction, customer loyalty, latent variable model, smoothing model

1. Introduction

We consider the customer satisfaction as one of the primary elements of the optimal model of corporate governance (Kanji, 2000) and its measurement is an interesting topic for the companies (Kristensen, 1992). As far as the measurement of customer satisfaction is concerned the issue of scales of measurement (Zanella & Cerri, 1999) must be addressed. It is well-known that the diversity of scales influences quite remarkably the choice of the statistical techniques employed to measure customer satisfaction. On the other hand, studies in business psychology determine which are the cognitive prerequisites of customer satisfaction (Oliver, 1999), whereas studies of methodological statistics identify the right tools to possibly measure it and put it in a single dimension (Montinaro & Chirico, 2006). The conceptual process of customer satisfaction is achieved through a model of latent variables (Zanella, 1998) identifying more indicators X_i for the same dimension and associating to this very dimension a single latent unobservable variable.

Considering an application to a simulation study using a survey, from every interviewee we want to obtain an overall assessment of the customer satisfaction, Y, expressed on a discrete scale of score-only order, the likely modes being $y_i \in \{1,2,\ldots,I_y\}$; similarly to what indicated for the Thurstone model, it is also supposed that, for each interviewee, the ratings of satisfaction regarding the characteristics of *K* expressed on discrete scoring-only order scales are available.

Further assume the valid model being (Zanella, 1998):

$$Y = \sum_{k=1}^{K} \beta_k^o W_k(b_k^o) X_k(a_k^o) + \varepsilon \tag{1}$$

where $\beta_k^o \geq 0$ are specific values of real unknown parameters $\beta_k \geq 0$ $k = 1,2,\ldots,K$

$W_k(b_k^o)$ and $X_k(a_k^o)$ are random, not observable, variables, with a_k^o and b_k^o specific values of real parameters a_k and b_k; ε is a random variable with zero mean and finite variance.

To properly use statistical techniques, the process of customer satisfaction measurement involves the validation of a model and the use of conventional rating scales. Hence, we obtain the identification and selection of the estimates generated by the values of customer satisfaction. Starting from the concept of customer satisfaction and its measurement by a latent variable model we introduce the concepts of *customer loyalty* and *market segmentation* to try to develop an innovative measurement instrument that valuate the consumer attitude toward the companies goods or services. A work that considers the concept of customer loyalty is in Chaudhuri and Holbrook (2001); the authors tested a model to relate loyalty constructs as brand affect and brand trust to join market success indexes. Oliver (1999) considers the concept of loyalty trough the definitions: conative, cognitive, affective and action also giving an explanation of the transition from customer satisfaction to customer loyalty by a transformative process. Montinaro (2007) considers the passage from customer satisfaction and customer loyalty by a cumulative process both function by market segmentation and repeated satisfaction over time. The development of customer loyalty is the synthesis of a process that involves a series of positive shopping experiences, namely a cumulative series of positive measures of customer satisfaction (Montinaro, 2007) and in a previous work (Montinaro & Sciascia, 2011) we consider an initial description of the relationships between the concepts of customer satisfaction, customer loyalty, market segmentation.

To collect the three instruments the companies needs resources and competence like highly qualified human resources and advanced technology. The availability of complex informative sources, such as corporate databases which collect transational data, makes possible the definition of well-defined market segments through marketing studies that can involve large number of variables and which were unaffordable even few years ago. If we associate to these market segments, those measures of customer satisfactions that describe, on the basis of the analysis of customers' attitudes and behavior, how much a product or a service match clients' expectations, then we get a winning strategy that ends up characterizing the different profiles of customer loyalty. Customer loyalty is a strategic objective for a company since gaining the trust of a customer leads to an increase of profit. We believe that an effective market segmentation represents the right methodological tool for defining the new kinds of customer loyalty required by a global economy. The activities associated to customer satisfaction can be considered short term plans, that is, tactics. More complex business activities oriented to customer loyalty are instead strategics (Montinaro, 2007). Customer loyalty needs realization periods that are of medium to long term range, which are linked to the life span of a product and require high costs.

2. Customer Satisfaction, Customer Loyalty and Market Segmentation

If we assume that the customer loyalty is a sum of the customer satisfaction repeated in the time we can build a time series of customer satisfactions with the following notations:

S: customer satisfaction

L: cutomer loyalty.

If we propose two perspective of calculation:

a) a *generalized model* arisen from the simple sum of measurements of the different customer satisfactions;

b) a *smoothing model* of measurement, that through the use of a coefficient α allows to consider more meaningful the most recent measurements of satisfaction.

To this aim the model for measuring the customer satisfaction proposed by Zanella (1998) is here considered:

$$S = \sum_{k=1}^{K} \beta_k W_k X_k + \varepsilon \quad (2)$$

It is suggested to develop the model in function of time and considering an *N* number of interviewees using an interview panel employed at regular intervals through time, it is possible to analyze the behaviour of the satisfactions.

If we consider customer loyalty as a series of positive customer satisfactions (Montinaro, 2007), we could propose the *generalized model*

$$L_g = \sum_{t=0}^{T} \sum_{k=1}^{K} \beta_k W_k X_k + \varepsilon \quad (3)$$

$t \in \{0,1,\dots,T\}$ is the time at wich satisfaction is detected

$k \in \{0,1,\dots,K\}$are the product attributes

Consider the customer loyalty L as a sum over time of the index of customer satisfaction obtained from different attributes and the relative importance of attributes. The optimal estimators of the equation would be obtained through the method of least squares thus minimizing the values of the squared differences between observed values and estimated values on a sample of N individuals, with

$$e(\beta_k^*) = min\{\sum_{i=1}^{N} [y_{it} - \sum_{k=1}^{K} (\beta_k w_k x_k)_{it}]^2\} \quad (4)$$

$$i \in \{0,1,\dots,N\}$$

$$t \in \{0,1,\dots,T\}$$

$$k \in \{0,1,\dots,K\}$$

Consider the possibility to have an assessment of respondents on two attributes with relative weights. The optimal estimators b_1 and b_2 are generated from:

$$e(b_1^*, b_2^*) = min\{\sum_{i=1}^{N} [y_{it} - (b_1 w_1 x_1 + b_2 w_2 x_2)_{it}]^2\} \quad (5)$$

$i \in \{0,1,\dots,N\}$

$t \in \{0,1,\dots,T\}$

If we attribute different importance on different measurements of the time series we obtain another measure of loyalty. If we choose a parameter α, $0 \leq \alpha \leq 1$, the *smoothing model* is:

$$L_s = \sum_{t=0}^{T} \sum_{k=1}^{K} (\beta_k W_k X_k)(1-\alpha)^{T-t}\alpha + \varepsilon \quad (6)$$

$t \in \{0,1,\ldots,T\}$

$k \in \{0,1,\ldots,K\}$

and the estimation by the least-square estimation criterion with a sample of N respondents is:

$$e(\beta_k^*) = min\{\sum_{i=1}^{N} [y_{it} - \sum_{k=1}^{K} (\beta_k w_k x_k (1-\alpha)^{T-t}\alpha)_{it}]^2\} \quad (7)$$

$i \in \{0,1,\ldots,N\}$

$t \in \{0,1,\ldots,T\}$

$k \in \{0,1,\ldots,K\}$

With the same considerations suggested in the previous section, optimal estimators b_1 and b_2 can be obtained through the method of least squares from the expression:

$$e(b_1^*, b_2^*) = min\{\sum_{i=1}^{N} [y_{it} - (b_1 w_1 x_1 (1-\alpha)^{T-t}\alpha + b_2 w_2 x_2 (1-\alpha)^{T-t}\alpha)_{it}]^2\} \quad (8)$$

$i \in \{0,1,\ldots,N\}$

$t \in \{0,1,\ldots,T\}$

Until here we obtained two measures of customer loyalty: L_g and L_s and we intend now to introduce a further relation of the *customer loyalty measurement trying to join the market segmentation*. The market segmentation is an activity to reduction of the market complexity (Smith, 1956) and we assume to employ a simple segmentation strategy to describe an innovative model of calculation of the customer loyalty.

We propose the simple market segmentation:

- the first segment consists of values included in the first quartile of the distribution of variable S;

- the second segment consists of values included in the second and third quartile of the distribution of variable S;

- the third segment consists of values included in the fourth quartile of the distribution of variable S.

We assume to attribute different weights to the different segments obtained; the aim is to give less importance, in the calculation of customer loyalty, to the extreme values of the distribution of the response variable, namely the first and third segments.

If the variable S is:

$$S = \sum_{k=1}^{K} \beta_k W_k X_k + \varepsilon$$

The calculation of customer loyalty takes place considering the three chances connected to the segmentation of the response variable:

$$L_{S_{1Q}} = \sum_{t=0}^{T} \sum_{k=1}^{K} (\beta_k W_k X_k)(1-\alpha)^{T-t}\alpha[1-\delta]\delta + \varepsilon \quad (9)$$

$$\bar{s}_{it} \in 1Q$$

$$t \in \{0,1,\ldots,T\}$$

$$k \in \{0,1,\ldots,K\}$$

$$L_{S_{23Q}} = \sum_{t=0}^{T} \sum_{k=1}^{K} (\beta_k W_k X_k)(1-\alpha)^{T-t}\alpha\delta + \varepsilon \quad (10)$$

$$\bar{s}_{it} \in 2Qand3Q$$

$$t \in \{0,1,\ldots,T\}$$

$$k \in \{0,1,\ldots,K\}$$

$$L_{S_{4Q}} = \sum_{t=0}^{T} \sum_{k=1}^{K} (\beta_k W_k X_k)(1-\alpha)^{T-t}\alpha[1-\delta]\delta + \varepsilon \quad (11)$$

$$\bar{s}_{it} \in 4Q$$

$$t \in \{0,1,\ldots,T\}$$

$$k \in \{0,1,\ldots,K\}$$

with

$$0 \leq \alpha \leq 1$$
$$0 \leq \delta \leq 1$$

The overall customer loyalty is:

$$L = L_{S_{1Q}} + L_{S_{23Q}} + L_{S_{4Q}} \tag{12}$$

Where $\bar{s}_{it}$ is the mean, for the subject i of the satisfaction variable at moments of time of detection t. In practice, the model suggested in Eq. 12 consists of three addends correspondents to the three segments and it takes into account two smoothing actions: the first related to the time for which it is believed that the most recent rewards are more important in measuring customer loyalty and a second one which is strictly related to the stratification in the responses of customer satisfaction. In this case we believe that the responses of the most extreme quartiles can be considered outliers, thus attributing to them a minor weight compared to the one given to the responses of satisfaction located in the central quartiles. Given two attributes(x_i) $i = 1{,}2$ and relative weights(w_i) $i = 1{,}2$ minimizing the error of estimation with least squares we obtain the optimal values b_1^* and b_2^*:

$$b_1^* = \frac{\sum_{i=1}^{N} s_i w_{1i} x_{1i} - \sum_{i=1}^{N} x_{1i} w_{1i} b_2 x_{2i} w_{2i}}{\sum_{i=1}^{N} (w_{1i} x_{1i})^2} \tag{13}$$

$$b_2^* = \frac{\sum_{i=1}^{N} s_i w_{2i} x_{2i} - \frac{\sum_{i=1}^{N} x_{1i} w_{1i} w_{2i} x_{2i} \sum_{i=1}^{N} s_i x_{1i} w_{1i}}{\sum_{i=1}^{N} (w_{1i} x_{1i})^2}}{\sum_{i=1}^{N} (w_{2i} x_{2i})^2 - \frac{(\sum_{i=1}^{N} x_{1i} w_{1i} x_{2i} w_{2i})^2}{\sum_{i=1}^{N} (w_{1i} x_{1i})^2}} \tag{14}$$

3. Simulation Study

We perform a *simulation* with a panel interview repeated 5 times, reliving the following variables on a sample of 10 respondents:

x_1: product quality

w_1: weight of the characteristic "quality"

x_2: product assortment

w_2: weight of the characteristic "assortment"

We consider also, for the simulation, the following hypothesis of normality of the variables listed in Table 1:

Table 1. Hypothesis of normality of the variables

Q	***QW***	***A***	***AW***	***ε***
N(3,0.25)	N(3,0.25)	N(2,0.25)	N(2,0.25)	N(0,1)

We obtain the distribution of the variable $\bar{s}_{it}$ and the segments obtained, described in Table 2.

Table 2. Simulated dataset and segmentation in three clusters

Interviewee	*Satisfaction mean*	*Cluster (by quartiles)*	*Interviewees*
1	7.8	1 *Q*	6, 8
2	6.2	4 *Q*	5, 9
3	7	2 and 3 *Q*	all the others
4	5.8		
5	8.2		
6	5.6		
7	7		
8	5		
9	8		
10	6.2		

The achievements of the variables have been approximated obtaining discrete values.

The simple segmentation that we decided to use for this example is the division into quartiles of the variable declared as satisfaction by Eq. 9, 10, 11 claiming three clusters as in Table 2.

We estimate the optimal parameters b_1^* e b_2^* and then we calculate the values of loyalty. We interpret the values of loyalty and the mean and median, for comparison with worst case and best case. We construct any indexes that take into account the value of customer satisfaction average for the subject and value of customer loyalty for the same subject, also for comparison between values of the total sample: mean and median in the sample, at the time of satisfaction variable and average and median of the variable by building loyalty with the Eq. 9, 10, 11 that we propose.

$$b_1^* = 0.4837 \tag{15}$$

$$b_2^* = 0.5362 \tag{16}$$

Table 3 describes the customer loyalty calculation results.

Table 3. Customer satisfaction and Customer loyalty (CL)

Interviewee	*Satisfaction mean*	*CL (Eq. 12)*
1	7.8	0.62
2	6.2	0.58
3	7	0.56
4	5.8	0.51
5	8.2	0.51
6	5.6	0.37
7	7	0.52
8	5	0.40
9	8	0.49
10	6.2	0.52

We can compare the values obtained from our estimation of loyalty with theoretical worst case (1 responses both in quality than for weight for each respondent for each detection time) and best case (4 responses both in quality than for weight for each respondent each detection time). With our example, the mean and median values for the variable customer loyalty built as algorithm of Eq. 9, 10, 11, is worst case mean 0.077, median 0.083, best case mean 1.23, median 1.333 and sample mean is 0.51 and median 0.52.

4. Conclusion

The work takes its cue from theoretical studies in customer satisfaction analysis and trying to integrate different techniques proposed by different authors in marketing studies tries to propose a framework for the interpretation of tools useful for the analysis of customer loyalty that derives from market segmentation. This framework can be developed starting from different customer satisfaction and market segmentation models.

In the paper the unification into a single measuring model of the three primary components is suggested:

- market segmentation;
- customer satisfaction;
- customer loyalty.

Our calculation model of the customer loyalty construct joins concepts useful to the analysis of the choices of the consumer, true protagonist of the market choices; the model permits to insert correlated measures: the customer satisfaction measurement and the market segmentation classification. The smoothing model proposed for the simulation study presented permits to adopt strategics choices both on weights to attribute to the customer satisfaction measurements and on the segments of consumers.

The analysis of customer loyalty as a competitive tool starts from the customer satisfaction analysis that we can consider a short-term tool (Montinaro, 2007; Montinaro & Chirico, 2006) that measures with a latent variable model (Zanella, 1998) a characteristic feature of satisfaction relating to a specific moment. Therefore, if we want to make an analysis of time and use more time series analyzes of repeated satisfactions over time, we can also speak of a strategic tool that is customer loyalty (Dick & Basu, 1994; Chaudhuri & Holbrook, 2001; Montinaro & Sciascia, 2011). Market segmentation can be top down by choosing a priori the characteristics on which to segment or bottom up, being guided by analysis after a clustering process itself. The segmentation can be based on different variables ranging from socio-demographic variables to psychographic variables (Brangule-Vagsma et al., 2002). In the approach used in this work, the segmentation considers the satisfactions repeated over time as variables, simulating a clustering based on this assumptions. In this way it is possible to find a synergy between tactical and strategic analysis tools in the market segmentation process.

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References

Brangule-Vlagsma, K., Pieters, R. G. M., & Wedel, M. (2002). The dynamics of value segments: modeling framework and empirical illustration. *International Journal of Research in Marketing*, *19*(3), 267–285. https://doi.org/10.1016/S0167-8116(02)00079-4

Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. *Journal of Marketing*, *65*, 81–93. https://doi.org/10.1509/jmkg.65.2.81.18255

Dick, A. S., & Basu, K. (1994). Consumer Loyalty: Towards an integrated conceptual approach. *Journal of the Academy of Marketing Science*, *22*(2), 99–113. https://doi.org/10.1177/0092070394222001

Kanji, G. K., & Wallace, W. (2000). Business excellence trough customer satisfaction. *Total Quality Management*, *11*(7) 979–998. https://doi.org/10.1080/09544120050135515

Kristensen, K., Kanji, G. K., & Dahlgaard, J. J. (1992). On measurement of customer satisfaction. *Total Quality Management*, *3*(2), 123–128. https://doi.org/10.1080/09544129200000013

Montinaro, M. (2007). *Sui metodi statistici per la misurazione della Customer satisfaction tra ruoli tattici ed impostazioni strategiche Valutazione e Customer Satisfaction per la Qualita' dei Servizi* (pp. 209–212). Atti della Riunione Scientifica, Roma, Facolta' di Economia Tor Vergata.

Montinaro, M., & Chirico, P. (2006). Customer Satisfaction measurement procedures: One-dimensional and multi-dimensional approach. *Statistica Applicata*, *18*(2), 277–296.

Montinaro, M., & Sciascia, I. (2011). Market segmentation models to obtain different kinds of customer loyalty. *Journal of Applied Sciences*, *11*(4), 655–662. https://doi.org/10.3923/jas.2011.655.662

Oliver, R. L. (1999). Whence consumer loyalty? *Journal of Marketing*, *63*, 33–44. https://doi.org/10.2307/1252099

Smith, W. (1956) Product differentiation and market segmentation as alternative marketing strategies. *Journal of Marketing*, *21*, 3–8. https://doi.org/10.1177/002224295602100102

Zanella, A. (1998). A statistical model for the analysis of customer satisfaction: Some theoretical and simulation results. *Total Quality Management*, *9*(7), 599–609. https://doi.org/10.1080/0954412988299

Zanella, A., & Cerri, M. (1999). La misura della customer satisfaction: qualche riflessione sulla scelta delle scale di punteggio. In *Valutazione della qualita' e customer satisfaction: il ruolo della statistica Vita e Pensiero*. Milano.

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