Capturing the hidden nature of customer relationship expansion: moving from the static to dynamic metrics of customer experience

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Abstract:

This study investigates how different dimensions of the customer experience (i.e., trend, fluctuation, and the gains and losses in comparison with the reference point) affect customer relationship expansion over time. Building on prospect theory, we develop an integrated framework in which we test empirically using a longitudinal dataset that combines attitudinal and behavioral information for a sample of 13,761 customers, covering all firms in the industry in one European country for four major telecommunication service categories (mobile, broadband, TV, and landline). We apply hidden Markov modeling (HMM) techniques to uncover latent states of the customer relationship expansion and the results identify four states through which the relationship between customers and firms are expanded. The findings also reveal the central role played by the different dimensions of customer experience on promoting customer relationship expansion.

Keywords: Customer relationship expansion, customer experience, hidden Markov model
Track: Relationship marketing

1. Introduction

Alongside with the increasingly evolving competitive environment, understanding and managing customer relationship expansion is fundamental to fuel growth (Du, Netzer, Schweidel, and Mitra, 2021). Companies are increasing their investment in customer experience in an exponential manner, with the expectations that these investments will promote relationship growth, which ultimately provide positive financial returns. Indeed, as emphasized by Forbes (2020), by 2027, global investment in customer relationship is expected to reach $114.4 billion, in effort to expand the relationship with the existing customers. Equally, how to effectively sustain profitable customer relationship expansion has been featured as one of the top research priorities by MSI (2020-2022). While the importance of expanding the established relationships to successfully enhance customer value is well acknowledged (Bolton, Lemon, and Verhoef, 2008; Shamsollahi, Chmielewski-Raimondo, Bell, and Kachouie, 2020), there is significant ambiguity surrounding this topic, since many times empirical practice ends with unprofitable financial returns (e.g., Du et al., 2021) due to various reasons.

One fundamental reason is that, capturing customer relationship expansion process is a significant challenge task for firms (Luo & Kumar, 2013; Zhang, Watson, Palmatier, and Dant, 2016), requiring firms to take into account numerous types of customer relationship expansion behaviors. Prior research, however, tends to consider on a single type: either choices toward cross-selling or upgraded offerings (i.e., Bolton, Lemon, and Verhoef, 2004, 2008), thereby resulting in a fragmented view on this topic (Zhang et al., 2016). More complicated is, to accurately uncover such process, firms are required to consider the impact of attitudinal measures in a long-time range (Luo & Kumar, 2013; McColl-Kennedy, Zaki, Lemon, Urmetzer, and Neely, 2019), in particular the role of customer experience, and most importantly of their different dimensions. Although customer experience has been increasingly considered as a critical factor to comprehensively reflect customer perceptions to uncover hidden intentions to expand the developed customer relationship with their firms, it receives scarce attention (McColl-Kennedy et al., 2019). More specifically, the existing studies have mainly focused on the absolute level of customer experience, failing to account for its tendency (i.e., *trend effect*) (Palmatier, Houston, Dant, and Grewal, 2013), its fluctuations (i.e., *fluctuation effect*) along the interactions with firms over time (Sivakumar, Li, & Dong, 2014), and the perceived *gains and losses* in comparison to the reference point (Shamsollahi et al., 2020).

In pursuit to fill these identified research gaps in the literature, drawing from the literature in customer relationship management (Bolton et al., 2004, 2008), we comprehensively capture the evolution of *customer relationship expansion states* through four aspects: (1) the number of

product and/or service categories purchased from the focal firm; (2) the usage level of the initially acquired product/or service category; (3) the decision about the upgraded offering; (4) the adoption toward the innovative product/service category provided by the focal firm. Most importantly, building on the premises of prospect theory (Kahneman & Tversky, 1979), we establish an integrative and conceptual framework in which we explore the role of different dimensions of the customer experience in terms of its *trend effect*, *fluctuation effect*, and the associated *gains and losses* in inducing migrations across customer relationship expansion states. Using a panel dataset which combines both attitudinal and behavioral information for a sample of 13,761 customers, covering all the firms from the telecom industry in one European country for four core service categories (mobile, broadband, TV, and landline) on a period of 48 months, we empirically test the framework via hidden Markov modeling (HMM) technique. In doing so, our work intends to make several important theoretical and empirical contributions to the marketing literature.

2. Conceptual Framework and Research Hypotheses

Grounded on prospect theory (Kahneman & Tversky, 1979), we develop a conceptual framework in which we focus on the roles played by a set of dimensions of customer experience (i.e., *trend effect*, *fluctuation effect*, and associated *gains and losses*) in the migration across customer relationship expansion states. Prospect theory postulates that individuals tend to base on the distance to a reference level rather than the absolute value while proceeding any kind of evaluations (Sivakumar et al., 2014). In the evaluation of the acquired customer experience, the perceived noticeable difference in comparison to the reference level (i.e., the average level) result in different patterns, which are regarded as the different dimensions of customer experience. More specifically, they encompass the tendency of the delivered customer experience – *trend effect* (Palmatier et al., 2013), the generated fluctuations of customer experience along the interactions with customers and firms- *fluctuation effect* (Shamsollahi et al., 2020), and finally the perceived gains and losses (Sivakumar et al., 2014). Such dimensions are fundamental for customers to determine the development of customer-firm relationships (McColl-Kennedy et al., 2019), in particular, the migration across customer relationship expansion states. The states of customer relationship expansion, as noted above, can be inferred by different manners, ranging from the number of product categories to purchase from the focal firm, the usage level of the already acquired product category, the decision about the upgraded offerings to the adoption toward the innovative product/service category provided by the focal firm.

2.1 Trend effect of customer experience

Trend effect as one of the key dimensions of customer experience is expected to exert significant influence in customer relationship expansion. Prior research specifically emphasize that individuals tend to project the future and make decisions based on the trend extrapolation (Johnson, Tellis, and MacInnis, 2005). Such process is usually proceeded as an unconscious and heuristic, driving customers to be more sensitive towards supported evidences and reject contrary information (Palmatier et al., 2013). Given an increasing trend of customer experience, customers will view the subsequent experiences more favorably, thus showing a more positive attitude to expand the established relationship with the focal firm. In contrast, if customers perceive that the customer experience is decaying, they will behave in ways that hinder relationship expansion.

H1a: Increasing trend in customer experience with the firm will have a positive impact on the migration across customer relationship expansion states.

H1b: Decreasing trend in customer experience with the firm will have a negative impact on the migration across customer relationship expansion states.

2.2 Fluctuation effect of customer experience

Fluctuations of customer experiences capture the variations in the trajectory of customer experience across time. Substantial evidence from the literature of judgement and decision-making demonstrate that the perceived fluctuations can be coded favorably or unfavorably (Sivakumar et al., 2014), which subsequently affect the evolution of relationship between customers and firms. Palmatier and coauthors (2014) specifically highlight that the evolution of exchange relationships between customers and firms are more linked to the change than the perceived experience in its absolute value, since individuals are more sensitive to fluctuations. More specifically, the way of how customers assess the fluctuation of customer experience varies depending on the situated level of customer experience (Sivakumar et al., 2014). For customers who regularly receive delightful customer experiences, they tend to visualize fluctuations in a more positive manner. In contrast, fluctuations are most likely to be viewed as negative phenomenon when customers encounter frequently experience failures.

H2a: For customers who usually have positive experience with the firms, fluctuations will have a positive impact on the migration across customer relationship expansion states.

H2b: For customers who usually have negative experience with the firms, fluctuations will have a negative impact on the migration across customer relationship expansion states.

2.3 Gains and losses in customer experience

As noted above, prospect theory indicates that individuals tend to assess the perceived customer experience in a relative manner by comparing with the reference level and encode them into gains and losses (Sivakumar et al., 2014), respectively. Delivering favorable customer experience (better than the average level) has been widely acknowledged as an essential strategic lever for firms to advance the development of customer relationship (McColl-Kennedy et al., 2019; Witell et al., 2020). We thus argue the high (low) level of customer experiences, which is usually as the obtained gains (losses), will exert positive (negative) influences in the migration across relationship expansion states.

H3a: High level of customer experience with the firm as gains will have a positive impact on the migration across customer relationship expansion states.
H3b: Low level of customer experience with the firm as losses will have a negative impact on the migration across customer relationship expansion states.

3. Data and Methodology
3.1 Data and sample

To empirically test the proposed framework and its hypotheses, multiple data sources have been integrated into a unified panel dataset. It includes a total of 13,761 customers, representative for major European telecom market. This database contained monthly customer information for a time window of 48 months (January 2013 to December 2016) related to four major telecommunication service categories (mobile, broadband, TV, and landline). All firms operating in the industry at this time period are encompassed, ranging from single service providers to multiple service providers. The dataset combines attitudinal and behavioral information. Customer experience is measured by the Net Promoter Score (NPS) in mobile service category where the baseline of customer relationship is established. This information is collected through a survey at the end of each year.

In table 1, we present the information about the set of variables which enable us uncover the hidden customer relationship expansion states, and most importantly the measurement of the different dimensions of customer experience. Finally, we also have information about a set of control variables related to firm characteristics (e.g., investment in product innovation,

complain frequency, and its resolution timing, market shares, and social media mentions), market characteristics (e.g., acquisitions, new entrants, iPhone release dates), and customer characteristics (e.g., gender, age, working status, and social class).

Variables	Description		M	SD
Dependent variables	*Customer relationship expansion states*	Monthly measured number of product categories purchased by customer i from the focal firm at time t.	.9915	1.2984
		The level of usage is monthly measured via the amount of mobile credit consumed by customer i at time t. It is categorized into four levels.	.5585	.9456
		Monthly measured dummy variable: 1 = customer i acquires the upgraded offering of the main product category from the focal firm at time t; 0 = otherwise	.0121	.1092
		Monthly measured dummy variable: customer i acquires the innovative product category from the focal firm at time t; 0 = otherwise	.1248	.3305
Customer experience dimensions	*Trend effect*	The tendency of increasing in customer experience is obtained by calculating the difference between the current NPS (at time t) and the previous NPS (at time t-1): the positive values represent the increasing trend and zero for others	.0144	.0771
		The tendency of decreasing in customer experience is obtained by calculating the difference between the current NPS (at time t) and the previous NPS (at time t-1): the negative values represent the decreasing trend and zero for others	-.0061	.1255
	Fluctuation effect	The fluctuation effect is calculated based on the standard deviation divided by the mean. The positive fluctuation is situated in the level of customer experience scored by customer i at time t which is higher than the average level of customer experience.	.0035	.0350
		The negative fluctuation is situated in the level of customer experience scored by customer i at time t which is lower than the average level of customer experience.	-.0036	.0056
	Gains	Customer experience is encoded into gains via a dummy variable: 1 = NPS scored by customer i at time t for mobile service category is higher than 7; 0 = otherwise.	.0307	.1727
	Losses	Customer experience is encoded into losses via a dummy variable: 1 = NPS scored by customer i at time t for mobile service category is lower than 7; 0 = otherwise.	.7603	.4269

Table 1: Descriptive Statistics

3.2 Methodology

To test the proposed conceptual framework, we apply a multivariate HMM modelling technique. An HMM describes the transition process among a finite set of latent states (i.e., customer relationship expansion states) which are invisible but can be inferred through a set of observable behaviors. It is therefore considered useful for investigating customer-firm relationships in a dynamic setting by inferring a set of hidden relationship states, uncovering the migration patterns across these states, as well as identifying the variables responsible for the correspondent migrations (Luo & Kumar, 2013; Netzer, Lattin, and Srinivasan, 2008). This method, thus, enables us to empirically discover the customer relationship expansion states

based on the observed customer behaviors (i.e., the number of purchased product categories, the usage level of the main product category, the adoption decision toward the upgrades offerings and the innovative product category). Most importantly, it allows us to identify the roles of different dimensions of customer experience (i.e., *trend effect, fluctuation effect, and the derived gains and losses*) in the migration across the captured customer relationship expansion states. The estimated HMM model consists of three components: the initial state distribution which indicates the probability that customers are encountered in a certain state in the first period of our dataset; the transition matrix which denotes the probability of a customer migrating from one customer relationship expansion state to another, over period, as well as the influence exerted by different dimension of customer experience[1]; and finally, the emission probability which controls the influence of firm characteristics, market characteristics, and customer characteristics.

4. Findings

4.1 Identifying relationship expansion states

Considering that we have no prior knowledge about the exact number of expansion relationship states, we estimate two-state to five-state models. Following the AIC and BIC criterion, the results indicate that the model with four-state HMM is the one which fits the dataset better than other alternatives. To comprehensively visualize the distribution of four relationship expansion states, the average of each state across the four estimated models has been calculated. In the basic state which represents the largest proportion of relationship expansion states (39%), customers tend to expand the relationship with the focal firm by acquiring other product or service categories provided by the focal firm. Moving from basic state to transition state which covers approximately 29% across all states, together with the improved relationship breadth, customers simultaneously deepen the established relationships by increasing the level of usage. The transformation state which covers 19% of the total sample is characterized by customers' special preference toward the innovative product category. In comparison to the transition state, although the number of product categories and the usage level of main product category acquired from the focal firm have been slightly decreased, they still maintain a higher level than the basic state. Lastly, in the active state which covers 13% of the sample, as illustrated by its definition, customers actively expand their relationships by

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[1] To avoid multicollinearity, the different dimensions of customer experience in the transition matrix have been estimated in a separate manner.

increasing the number of acquired product categories, the usage level of the main product category, as well as the adoption decision toward the innovative product category.

4.2 The effects of different dimensions of customer experience

The results of the empirical estimations about the effects of different dimensions of customer experience on the migration across relationship expansion states are shown in Table 2[2]. We mainly consider the migration across the customer relationship expansion states that develops from the worse state towards the better one. First, surprisingly, in contrast to our expectation, neither the increasing trend nor the decreasing trend significantly affect customer relationship expansion. Henceforth, H1a-b are not supported. About H2a-b, as we expected, the migration across expansion relationship states is significantly affected by fluctuations of customer experience, thus leading support to H2a-b. More specifically, fluctuations of customer experience situated in the high (low) level are usually visualized from a more positive (negative) perspective by customers, thus increasing (decreasing) the possibility of relationship expansion states migration. Finally, in support of H3a-b, we observe that the gains (losses) derived from the better (worse) customer experience in comparison to the reference level positively (negatively) and significantly affects the possibility of customer relationship expansion.

Hypothesis and Results	Models	Customer relationship expansion states transition matrix			
H1a-b Not supported	**Model 1**	*Customer experience trend effect*			
		Expansion states	S1	S2	S3	S4
	Positive trend	S1	0			
		S2	.09	0		
		S3	-.582	.2064	0	
		S4	-96.275	-.1949	-.031	0
	Negative trend	**Expansion states**	S1	S2	S3	S4
		S1	0			
		S2	10.619	0		
		S3	-.1104	-.157	0	
		S4	36.492	.2932	18.358	0
H2a-b Supported	**Model 2**	*Customer experience fluctuation effect*			
		Expansion states	S1	S2	S3	S4
	Positive fluctuations	S1	0			
		S2	**.8842***	0		
		S3	.7795	.2448	0	
		S4	**1.0269*****	**1.2317****	11.598	0
	Model 3	**Expansion states**	S1	S2	S3	S4
	Negative fluctuations	S1	0			
		S2	**-.4652***	0		
		S3	-.3283	-.6632	0	
		S4	66.031	**-.6383***	-.4259	0
H3a-b	**Model 4**	*Customer experience level effect*			

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	Expansion states	S1	S2	S3	S4
Gains	S1	0			
	S2	**.2683****	0		
	S3	**.7678*****	-.3405	0	
	S4	**.5977*****	**.3097***	**.4076****	0
	Expansion states	S1	S2	S3	S4
Losses	S1	0			
	S2	**-.1313****	0		
	S3	**-.4282*****	-.2826	0	
	S4	-.0081	**-.2415*****	.1887	0

Note: *significant Parameters highlighted in bold: *** p. <.01; **p<.05; *p<.10;*
CX means customer experience;
S1, S2, S3, and S4 represent different relationship expansion states, ranging from basic state, transition state, transformation state to active state, respectively.

Table 2: Estimation results

5. Theoretical and Empirical Implications

The marketing literature is demanding a better understanding about how to fuel customer relationship growth (Du et al., 2021; Shamsollahi et al., 2020). In pursuit of providing a comprehensive view about customer relationship expansion, drawing on the literature in customer relationship management (Bolton et al., 2004, 2008), we capture such relationship expansion by considering the different aspects of the established relationships between customers and firms in terms of breadth and depth. Most importantly, based on the central premise of prospect theory, we establish an integrative and encompassing framework which enables us to improve the understanding about the dynamic process of how customer relationship is expanded state by state - the migration process of customer relationship expansion states. Moreover, through the proposed conceptual framework, we further distinguish the different dimensions of customer experience (i.e., *trend effect*, fluctuation *effect*, and the derived *gains and losses)* and identify their roles in stimulating the migration across customer relationship expansion states. In this way, we address the recent calls on investigating the customer experience from a dynamic perspective and its linkage with customer relationship management (Lemon & Verhoef, 2016).

In addition to the theoretical implications, this study provides managers with some guidelines about how to optimally manage marketing investments to promote the desired relationship expansion state. First, firms may infer the customer relationship expansion state where customers are encountered in a more accurate manner via the observed customer behaviors from different aspects, such as the number of purchased product categories, the usage level of the main product category, and others. Second, beside of the customer relationship expansion states, through the HMM modeling, firms may even capture the detailed process

through which customer relationship is expanded, that is, the migration across relationship expansion states. Third and most importantly, depending on the identified customer relationship expansion state, firms may segment their customers. In this way, firms are able to optimally dedicate efforts and resources to encourage different dimensions of customer experience, thereby enabling them to focus on the desired relationship expansion state and stimulate the subsequent migration process. For example, as revealed in the findings, if the customer is situated in the basic state of relationship expansion, firms should know how the customers perceive their experiences with firms, in means of the fluctuations, the associated gains or losses, and then decide whether to focus on improving the customer experience or increasing its fluctuations.

References
Bolton, R. N., Lemon, K. N., & Verhoef, P. C. (2008). Expanding business-to-business customer relationships: Modeling the customer's upgrade decision. *Journal of marketing*, 72(1), 46-64.
Du, R. Y., Netzer, O., Schweidel, D. A., & Mitra, D. (2021). Capturing Marketing Information to Fuel Growth. *Journal of Marketing*, in press.
Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47, 263–291.
Lemon, K. N., & Verhoef, P. C. (2016). Understanding customer experience throughout the customer journey. *Journal of marketing*, 80(6), 69-96.
Luo, A., & Kumar, V. (2013). Recovering hidden buyer–seller relationship states to measure the return on marketing investment in business-to-business markets. *Journal of Marketing Research*, 50(1), 143-160.
Marketing Science Institute (MSI). (2020). Research priorities 2020–2022. Available at https://www.msi.org/wp-content/uploads/2020/06/MSI_RP20-22.pdf (accessed 10 December 2020).
McColl-Kennedy, J. R., Zaki, M., Lemon, K. N., Urmetzer, F., & Neely, A. (2019). Gaining customer experience insights that matter. *Journal of Service Research*, 22(1), 8-26.
Netzer, O., Lattin, J. M., & Srinivasan, V. (2008). A hidden Markov model of customer relationship dynamics. *Marketing science*, 27(2), 185-204.
Palmatier, R. W., Houston, M. B., Dant, R. P., & Grewal, D. (2013). Relationship velocity: toward a theory of relationship dynamics. *Journal of Marketing*, 77(1), 13-30.
Shamsollahi, A., Chmielewski-Raimondo, D. A., Bell, S. J., & Kachouie, R. (2020). Buyer–supplier relationship dynamics: a systematic review. *Journal of the Academy of Marketing Science*, 1-19.
Sivakumar, K., Li, M., & Dong, B. (2014). Service quality: The impact of frequency, timing, proximity, and sequence of failures and delights. *Journal of Marketing*, 78(1), 41-58.
Witell, L., Kowalkowski, C., Perks, H., Raddats, C., Schwabe, M., Benedettini, O., & Burton, J. (2020). Characterizing customer experience management in business markets. *Journal of Business Research*, 116, 420-430.
Zhang, J. Z., Watson Iv, G. F., Palmatier, R. W., & Dant, R. P. (2016). Dynamic relationship marketing. *Journal of Marketing*, 80(5), 53-75.