

## ASSESSING RETURN ON MARKETING CONTACTS IN B2B MARKET

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### ABSTRACT

For two reasons, Business-to-Business (B2B) marketers face greater challenges in measuring return on marketing investment than Business-to-Consumer (B2C) marketers. First, business buyers have an irregular purchase pattern. Second, marketing efforts take a longer time to build a business relationship. The purpose of this research is to capture the effect of marketing contacts such as direct mailings and telephone calls on buyer-seller relationships with heterogeneous buyer responses. Previous literature captured the effect of marketing contacts on buying behavior through a Hidden Markov model (Netzer, Lattin, and Srinivasan 2008). However, existing models are not able to capture heterogeneous marketing response parameters. This research developed from the above literature but has distinguishing features. First, marketing response parameters are heterogeneous across buyers. Allenby and Rossi (1999) suggest that uncertainty in individual level estimates should be incorporated, so that the marketers can make decisions based on customer differences. Second, this paper gives an in-depth examination of buyer-seller relationships in a business context. Third, this research provides detailed justification as to the reasons a Bayesian Hidden Markov model should be used and introduces the preferred approach of forward-backward method in Bayesian Hidden Markov model literature. Fourth, the hidden states are recovered through a forward-backward algorithm (Chib, 1996).

The Hidden Markov Model is composed of three parts: the initial probability, the transition probability, and the emission probability. The initial probability is captured by finding the stationary distribution. We suggest the transition probability between states is modeled through a logistic model. In this specification, we assume that the marketing response parameters are no longer the same across all customers but instead heterogeneous among customers. Furthermore, we assume that the marketing response parameters are a function of employment size and grand sales. Lastly, we need to find the distribution of the emission probabilities: the probabilities of observed purchase behavior given relationship states. We formulated the emission probability as Kumar, Sriram, Luo, and Chintagunta (2009).

To estimate the model, we need to simulate the parameters in different stages. Step 1: Simulate the right relationship states from Chib's (1996) Forward-Backward Method. Step 2: Simulate marketing contacts response parameters in the transition matrix. Step 3: Simulate the response parameters to firm level variables in the marketing contacts function. Step 4: Simulate the variance – covariance matrix for the marketing contacts function. Step 5: Simulate the threshold values; Step 6: Simulate the endogeneity parameters. Step 7: Simulate the state specific parameters in the emission distribution. Step 8: Simulate the latent utilities of purchasing hardware and software. Step 9: Simulate the marketing response parameters in the emission distribution. Step 10: Simulate the variance-covariance matrix for the emission distribution.

In conclusion, practitioners can gain insight in learning how individual customers respond to marketing contacts through relationship transitions. Using this information, firms can customize offers at the individual level depending on the individual parameters for the marketing contacts on transition force. Moreover, through our Bayes approach, we are able to better recover hidden relationship states.

Firms can understand what drives a customer in strengthening the relationship or maintaining the relationship at a desirable level, and which marketing tools are most effective. Therefore, our model provides sufficient flexibility so that firms can reach their customers effectively at the individual level. Finally, firms can evaluate the effectiveness of direct marketing tools, such as direct mailings and telephone calls. Direct marketing tools have been proven a useful tool in cultivating business buyer-seller relationships. In summary, through this research, we can understand the roles these tools play in maximizing ROI. However, this research does not account for missing competitor information. Future research should be directed to address this issue. Second, it will be interesting to explore various methods, such as the Verti algorithm to recover the true hidden relationship states. Third, management's subjective beliefs should be provided next time in order to better calibrate a prior distribution.

References Available on Request.