How Channel Promotions and Brand Promotions Work on Dual Markets Competition Together Based on a Weakest Online Manufacturer: From a Three-Dimensional Simulation Analysis Perspective

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Abstract. Channel promotions contest against brand promotions in the Internet, which affects all of supply chain partners’ decisions. The paper focuses on three partners’ dynamic game in dual markets and finds out their optimal promotion competition decisions. By three-dimensional simulation analysis it concludes some clear laws of management decisions, such as the traditional retailer’s living space in dual markets competition, and the strong manufacturer 1 could control its Internet brand promotion level to keep the weakest online manufacturer 2’s revenue within bounds, etc.

Keywords: Channel Promotions, Brand Promotions, Dual Markets Competition, Weakest Online Manufacturer, Three-Dimensional Simulation Analysis.

1 Introduction

Many Internet brand advertising columns such as Taobao Mall, Amazon.com, etc. have appeared in metro station, even in housing estate. At the same time, the channel promotions online or offline always be the main promotion forms for most manufacturers, etc. Today Internet market share has become more and more familiar with consumer on a global scale, so it has become an attractive cake for all kinds of industry manufacturers, who could release their overall capacity in the Internet, or find more opportunities to get better competitive power. Here, “Internet market and traditional market”, or “online market and traditional market” are called “dual markets”.

To the industry manufacturers, how to balance dual markets demands and seek out the optimal management decisions are difficult problems. Especially, more and more kinds of players have come into the dual markets to share the cake today, how to control promotion forms’ costs and their levels, even about their capacity decisions,
price decisions, etc. all of which are this paper focus on. In literature of Peiqin Li (2011) has given literatures review and models in detail, here it gives the simple model conclusions in section 2, and section 3 is the heart of this paper.

2 Model Description and Analysis

The manufacturer \( j (j = 1,2) \) sells homogeneous product \( i (i = 1,2) \) and they compete in the internet. Being a weakest partner, the online manufacturer 2 could increase its promotional efforts to get higher status in Internet competition. Meanwhile, being a supply chain leader the strong manufacturer 1 has set up a mature traditionally channel network, and the traditional retailer \( r \) plays an important role in dual markets competition who always is the manufacturer 1’s follower. The online manufacturer 2 has the weakest status in supply chain for that it is the bright younger generation. Now it could give out three partners’ demand functions as follows:

\[
D_1(p_1, w, e_{d1}, e_{b1}) = (a_e - mp_1 + np_2 + \theta(p_r - p_i) + \gamma e_{d1} - \lambda e_{d2} - \phi(e_r - e_{d1})) e_{b1}
\]

\[
D_2(p_2, e_{d2}, e_{b2}) = (a_e - mp_2 + np_1 + \theta(p_r - p_2) + \gamma e_{d1} - \lambda e_{d2} - \phi(e_r - e_{d2})) e_{b2}
\]

\[
D_r(p_r, e_r) = a_r - mp_r + \theta(p_r - p_i) + \theta(p_2 - p_r) + \gamma e_r + \phi(e_r - e_{d1}) + \phi(e_r - e_{d2})
\]

Channel promotion \( e_d \) and brand promotion \( e_b \) are two dimensions of Internet market promotional efforts. And the two manufacturers’ promotional effort costs are 

\[
g(e_{di}) = \kappa e_{di} (e_{di} \geq 0), \quad g(e_{bi}) = \kappa e_{bi} (e_{bi} \geq 0) \quad (i = 1,2), \quad \text{the parameter } \kappa (\kappa > 0) \text{ is the coefficient of the Internet promotion. Concurrently, the traditional retailer } r \text{ gives additional service } e_r (e_r > 0) \text{ to attract more customers, and its service cost is } \eta e_r^2/2, \quad \text{the parameter } \eta \text{ is the coefficient of service cost. In the demand functions } D_r, \text{ the variable } p_r \text{ is the retailer } r \text{'s sale price, and } w \text{ is its wholesale price, the parameter } \mu \text{ is marginal demand of its additional service, and the traditional retailer } r \text{ has to pay } F (F > 0) \text{ for its store rents, facility wages, etc.}

Among three demand functions, the parameter \( \theta (\theta > 0) \) means price demand pervasion level between dual markets, and the parameter \( \phi (\phi > 0) \) stands for promotional effort demand pervasion level between dual markets. The parameter \( c_j (j = 1, 2) \) is manufacturer \( j \) ’s product cost, and the variable \( p_j (j = 1, 2) \) is its Internet sale price, and the \( p_j > c_j > 0 (j = 1, 2) \) must be satisfied. The parameter \( a_e \) indicates product \( i (i = 1, 2) \)’s “comprehensive market demands base”, and the parameter \( a_r \) means customer demands in traditional market. The parameter \( m \) is demand’s reaction level to itself, the parameter \( n \) stands for products’ differentiation effects, \( m > n > 0 \). The parameter \( \gamma \) is product sale effort demand’s reaction level to itself, the parameter \( \lambda \) represents products’ sale effort