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# OPTIMAL ORDERING POLICY FOR DETERIORATING ITEMS IN RESPONSE TO A TEMPORARY PRICE DISCOUNT LINKED TO ORDER QUANTITY AND STOCK-DEPENDENT DEMAND

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**Abstract:** In this study, the effect of a temporary price discount for a larger order than the regular order offered by the supplier on the retailer's ordering policy is studied. The demand is assumed to be stock-dependent. The units in inventory deteriorate at a constant rate. This study will help the retailer to take the decision whether to adopt a regular or special order policy. The optimum special quantity to be procured is determined by maximizing the total cost saving between the special and regular orders for the cycle time. The algorithm based on analytic results is outlined to take the favorable decision. The numerical examples are given to support the derived results. The sensitivity analysis is carried out to determine the critical inventory parameters.

## INTRODUCTION

To boost the demand, increase market share and cash-flow, the supplier offers a temporary price discount to the retailer. For the retailer, the question is to find out whether or not it is advantageous to buy special order at a discounted price or not?" The impact of price discount on the order policy is well cited in review article by Dixit and Shah (2005). The all-unit quantity discounts ordering policy is discussed by Arcelus et al. (2003), Abad (2007), Shah et al. (2005), Bhaba and Mahmood (2006), Abad (2007), Dye et al. (2007), Shah et al. (2008), Mishra and Shah (2009) and their cited references. These formulations assumed that the price discount rate is independent of the special order quantity. However, in market, it is observed that the supplier offers a quantity discount to entice larger orders. For the larger order, the higher price discount rate is offered by the supplier and thereby reducing his inventory. Here,, the retailer has to settle the trade-off for purchase price savings against higher total holding cost.

In addition to holding cost, the retailer incur deterioration cost for products like; dairy products, volatile liquids, blood components, fruits and vegetables, medical accessories etc. The literature surveys by Raafat (1991), Shah and Shah (2000) and Goyal and Giri (2001) advises the retailer to take care of ordering policy while dealing with deteriorating items. One can review Moon et al. (2005), Deng et al. (2007), Liao (2007).

Ouyang et al. (2009) developed a decision policy when a supplier offers a temporary price discount to a retailer for larger order. The price discount rate depends on the units ordered. They assumed that the demand is constant and deterministic.

In this paper, an impact of a temporary price discount on the retailer's ordering policy is studied when the demand is stock-dependent and price discount rate is linked to special order quantity. The units in inventory are subject to a constant deterioration. This analysis will help the retailer to adopt or decline the sales promotional scheme. The retailer's optimal special order quantity is obtained by maximizing the total cost savings between the special and regular orders during a special order cycle time. Two scenarios are discussed : (1) the special order time occurs at the retailer's replenishment time, and (2) the special order time occurs during the retailer's regular cycle time. A computational procedure is outlined to decide to the optimal solutions. The numerical examples are given to support the validated the theoretical results. The sensitivity analysis of the optimal solutions is carried out with respect to the model parameters. The managerial issues are derived.

**NOTATIONS AND ASSUMPTIONS**

The following notations and assumptions are used to formulate the proposed problem :

**Notations**

$R(I(t))$	$(= \alpha + \beta I(t))$ , stock-dependent demand rate where $\alpha > 0$ is scale demand and $0 \leq \beta < 1$ is stock-dependent parameter
$C$	Unit purchasing cost
$A$	Ordering cost per regular or special order
$I$	Holding cost rate per annum
$\alpha$	Constant deterioration rate; $0 \leq \theta < 1$
$Q$	Order quantity under regular policy
$Q^*$	Optimal order quantity when regular order policy is adopted
$T$	Cycle time when regular order policy is adopted
$T^*$	Optimal cycle time for using a regular order policy
$Q_s$	Special order quantity at discounted price (a decision variable)
$T_s$	Cycle time for the special order quantity $Q_s$
$Q$	Inventory level before the arrival of the special order quantity; $q \geq 0$
$t_q$	Cycle time when $q$ – units deplete to zero
$T_W$	Cycle time for depletion of the inventory level $W = Q_s + q$
$I(t)$	Inventory level at time $t$ when the regular order policy is adopted; $0 \leq t \leq T$
$I_s(t)$	Inventory level at time $t$ when the special order policy is adopted; $0 \leq t \leq T_s$
$I_W(t)$	Inventory level at time $t$ when the special order policy is adopted; $0 \leq t \leq T_W$ where $W = Q_s + q$

**Assumptions**

- (a) The single item inventory system is considered.
- (b) The supplier offers the retailer a temporary price discount if the order quantity is larger than the regular order quantity  $Q^*$ . The discount rate depends on the quantity ordered and the discount schedule is as follows :

Class	Special order quantity	Discount rate
1	$Q_1 \leq Q_s < Q_2$	$d_1$
2	$Q_2 \leq Q_s < Q_3$	$d_2$
$\vdots$	$\vdots$	$\vdots$
$n$	$Q_n \leq Q_s < Q_{n+1}$	$d_n$

where  $Q_k$  is the  $k$ -th discount rate breaking point,  $k = 1, 2, \dots, n+1$  and  $Q^* < Q_1 < Q_2 < \dots < Q_{n+1} = \infty$ ;  $d_k$  is the price discount rate offered by the supplier when the retailer's order quantity  $Q_s$  belongs to the interval  $[Q_k, Q_{k+1})$  and  $0 < d_1 < d_2 < \dots < d_n$ .

- (c) The price discount is not passed on to the customers.
- (d) Only one time price discount is offered.
- (e) The replenishment rate is infinite.
- (f) The lead-time is zero or negligible and shortages are not allowed.
- (g) The units in inventory deteriorate at a constant rate. The deteriorated units can neither be repaired nor replaced during the period under review.

**MATHEMATICAL MODEL**

The goal of the study is to decide the advantage of temporary price discount for larger order than the regular order, under the assumption of the stock-dependent demand and constant rate of deterioration of units in retailer’s inventory system. If the retailer follows a regular order policy without a temporary price discount, then the inventory depletes in the retailer’s inventory system due to the stock-dependent demand and deterioration of units. The rate of change of inventory level can be described by the differential equation

$$\frac{dI(t)}{dt} = -(\alpha + \beta I(t) + \theta I(t)), \quad 0 \leq t \leq T \tag{1}$$

With boundary condition  $I(T) = 0$ , the solution of (1) is

$$I(t) = \frac{\alpha}{\lambda} [\exp(\lambda(T-t)) - 1], \quad 0 \leq t \leq T \tag{2}$$

where  $\lambda = \theta + \beta$ .

Hence, the order quantity is

$$Q = I(0) = \frac{\alpha}{\lambda} [\exp(\lambda T) - 1] \tag{3}$$

In this case, the retailer’s total cost per order cycle is  $A + CQ + Ci \int_0^T I(t) dt$ . i.e.

$$A + \frac{C\alpha}{\lambda} [\exp(\lambda T) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T) - \lambda T - 1] \tag{4}$$

Therefore, the total cost per unit time without temporary price discount is

$$TC(T) = \frac{1}{T} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T) - \lambda T - 1] \right] \tag{5}$$

The convexity of  $TC(T)$  can be proved similarly as given in Dye et al. (2007). It guarantees that there exists unique value of  $T$  (say)  $T^*$  that minimizes  $TC(T)$ .  $T^*$  can be obtained by setting

$$\frac{dTC(T)}{dT} = A - \frac{C(i + \lambda)\alpha}{\lambda^2} [\lambda T \exp(\lambda T) - \exp(\lambda T) + 1] = 0 \tag{6}$$

Knowing the regular order cycle time  $T^*$ , the optimal order quantity without a temporary price discount,  $Q^*$  can be obtained as

$$Q^* = \frac{\alpha}{\lambda} [\exp(\lambda T^*) - 1] \tag{7}$$

The following two scenarios may arise when the supplier offers a temporary price discount and the retailer take advantage of this price reduction scheme by ordering quantity greater than  $Q^*$ : (1) when the special order time occurs at the retailer’s cycle time; and (2) when the special order time occurs during the retailer’s cycle time. We compute the corresponding total cost savings for these two scenarios.

**Scenario 1 : When the special order time occurs at the retailer’s cycle time** (Figure 1)

Here, the retailer gives special order of  $Q_s$  – units at the discounted price. Arguing as above, the inventory level of these  $Q_s$  – units at any instant of time  $t$  is given by

$$I_s(t) = \frac{\alpha}{\lambda} [\exp(\lambda(T_s - t)) - 1], \quad 0 \leq t \leq T_s \tag{8}$$

and the special order quantity is

$$Q_s = I_s(0) = \frac{\alpha}{\lambda} [\exp(\lambda T_s) - 1] \quad (9)$$

For each price discount rate  $d_i$ , the total cost  $TCS_{i_i}(T_s)$  of the special order during the time interval  $[0, T_s]$  is

$$TCS_{i_i}(T_s) = A + \frac{C(1-d_i)\alpha}{\lambda} [\exp(\lambda T_s) - 1] + \frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T_s) - \lambda T_s - 1], i=1, 2, \dots, n \quad (10)$$

On the other hand, if the retailer follows regular order policy of  $Q^*$  - units, total cost during  $[0, T_s]$  is

$$TCN_1(T_s) = \frac{T_s}{T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right] \quad (11)$$

Clearly,  $TCN_1(T_s) > TCS_{i_i}(T_s)$  for given  $d_i$ . Hence, the total cost savings,  $G_{i_i}(T_s)$  because of the offer of a temporary price discount is

$$G_{i_i}(T_s) = TCN_1(T_s) - TCS_{i_i}(T_s) \quad (12)$$

**Scenario 2 : When the special order time occurs during the retailer's cycle time (Figure 2)**

Here, we study the situation when the special order is to be given during the retailer's cycle time. At this time, the retailer has  $q$  - units and orders for  $Q_s$  - units which raises his inventory to  $W = Q_s + q$ . When the special order of  $Q_s$  - units is placed, the total cost during the interval  $[0, T_w]$  comprises of ordering cost; A, purchase cost as  $\frac{C(1-d_i)\alpha}{\lambda} [\exp(\lambda T_s) - 1]$  and the holding cost which is calculated as follows:

With the arrival of special order quantities, the stock on hand raises from  $q$  to  $W$ , where

$$W = Q_s + q = \frac{\alpha}{\lambda} [\exp(\lambda T_s) - 1] + \frac{\alpha}{\lambda} [\exp(\lambda t_q) - 1] = \frac{\alpha}{\lambda} [\exp(\lambda T_s) + \exp(\lambda t_q) - 2] \quad (13)$$

The inventory level at any instant of time  $t$  is given by

$$I_w(t) = \frac{\alpha}{\lambda} [\exp(\lambda(T_w - t)) - 1], 0 \leq t \leq T_w \quad (14)$$

$$\text{and } W = I_w(0) = \frac{\alpha}{\lambda} [\exp(\lambda T_w) - 1] \quad (15)$$

From (13) and (15), we have

$$T_w = \frac{1}{\lambda} \ln [\exp(\lambda T_s) + \exp(\lambda t_q) - 1] \quad (16)$$

The holding cost of  $q$  - units purchased at \$  $C$  per unit is  $\frac{Ci\alpha}{\lambda^2} [\exp(\lambda t_q) - \lambda t_q - 1]$  and that of the special order quantity  $Q_s$  available at \$  $C(1-d_i)$  per unit is

$$\begin{aligned} & C(1-d_i)i \left[ \int_0^{T_w} I_w(t) dt - \frac{\alpha}{\lambda^2} [\exp(\lambda t_q) - \lambda t_q - 1] \right] \\ &= \frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T_s) + \exp(\lambda t_q) - 2 - \ln(\exp(\lambda T_s) + \exp(\lambda t_q) - 1) - (\exp(\lambda t_q) - \lambda t_q - 1)] \quad (17) \end{aligned}$$

Therefore, the total holding cost of  $W$  - units during  $[0, T_w]$  is

$$\frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T_s) + \exp(\lambda t_q) - 2 - \ln(\exp(\lambda T_s) + \exp(\lambda t_q) - 1)] + \frac{Cid_i\alpha}{\lambda^2} (\exp(\lambda t_q) - \lambda t_q - 1)$$

(18)

Hence, for the fixed price discount rate  $d_i$ , the total cost  $TCS_{2i}(T_s)$  of the special order during  $[0, T_w]$  is

$$TCS_{2i}(T_s) = A + \frac{C(1-d_i)\alpha}{\lambda} [\exp(\lambda T_s) - 1] + \frac{Cid_i\alpha}{\lambda^2} (\exp(\lambda t_q) - \lambda t_q - 1) + \frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T_s) + \exp(\lambda t_q) - 2 - \ln(\exp(\lambda T_s) + \exp(\lambda t_q) - 1)] \quad (19)$$

If the retailer follows regular order policy, the total cost during the interval  $[0, T_w]$  will be computed for two periods. In the first period, he incurs the holding cost for  $q -$  units as

$$Ci \int_0^{t_q} I(t) dt = \frac{Ci\alpha}{\lambda^2} [\exp(\lambda t_q) - \lambda t_q - 1] \text{ and in the next period total cost as}$$

$$\frac{(T_w - t_q)}{T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right] = \frac{(\ln(\exp(\lambda T_s) + \exp(\lambda t_q) - 1) - \lambda t_q)}{\lambda T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right]$$

Therefore, the total cost of the inventory system is

$$TCN_2(T_s) = \frac{Ci\alpha}{\lambda^2} [\exp(\lambda t_q) - \lambda t_q - 1] + \frac{(\ln(\exp(\lambda T_s) + \exp(\lambda t_q) - 1) - \lambda t_q)}{\lambda T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right] \quad (20)$$

From (19) and (20), for a fixed discount rate  $d_i$ , the total cost savings;  $G_{2i}(T_s)$  is

$$G_{2i}(T_s) = TCN_2(T_s) - TCS_{2i}(T_s) \quad (21)$$

Obviously, the total cost savings in (12) and (21) have to be positive to qualify for special order quantity.

### ANALYTIC RESULTS

In this section, the optimal value of  $T_s$  is calculated that maximizes the total cost savings.

#### Scenario 1 : When the special order time occurs at the retailer's cycle time

For the fixed discount rate  $d_i$ , the derivative of  $G_{1i}(T_s)$  in (12) with respect to  $T_s$  gives

$$\frac{dG_{1i}(T_s)}{dT_s} = \frac{1}{T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right] - C(1-d_i)\alpha \exp(\lambda T_s) - \frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T_s) - 1] \quad (22)$$

$$\text{and } \frac{d^2G_{1i}(T_s)}{dT_s^2} = -C(1-d_i)(\lambda + i)\alpha \exp(\lambda T_s) < 0 \quad (23)$$

Eq. (23) proves that  $G_{1i}(T_s)$  is a concave function of  $T_s$ . Hence, a unique value of  $T_s = T_{s1i}$  (say) exists that maximizes  $G_{1i}(T_s)$ . Equating (22) to be zero gives value of  $T_{s1i}$  as

$$T_{s1i} = \frac{1}{\lambda} \ln \left[ \frac{C(1-d_i)i\alpha + \lambda x}{C(1-d_i)\alpha(\lambda+i)} \right] \quad (24)$$

where  $x = \frac{1}{T^*} \left[ A + \frac{C\alpha}{\lambda} [\exp(\lambda T^*) - 1] + \frac{Ci\alpha}{\lambda^2} [\exp(\lambda T^*) - \lambda T^* - 1] \right] > 0$ .

Clearly,  $Q^* < Q_{s1i}$  if and only if  $T^* < T_{s1i}$ . i.e.  $\Delta_{1i} > 0$  (25)

where  $\Delta_{1i} = x - C(1-d_i)\alpha \exp(\lambda T^*) - \frac{C(1-d_i)i\alpha}{\lambda^2} [\exp(\lambda T^*) - 1]$

Using (24) in (12) gives the corresponding maximum total cost savings as

$$G_{1i}(T_{s1i}) = \frac{C(1-d_i)\alpha(\lambda+i)}{\lambda^2} [\lambda T_{s1i} \exp(\lambda T_{s1i}) - \exp(\lambda T_{s1i}) + 1] - A \quad (26)$$

Denote  $\Delta_{2i} = G_{1i}(T_{s1i})$ . The retailer orders special order only if  $\Delta_{2i} > 0$ . Otherwise, he will continue with the regular order policy of  $Q^*$  - units. Hence, the optimal value of  $T_{s1i}$  (denoted by  $T_{s1i}^*$ ) for scenario 1 is

$$T_{s1i}^* = \begin{cases} T_{s1i}, & \text{if } \Delta_{1i} > 0 \text{ and } \Delta_{2i} > 0 \\ T^*, & \text{otherwise} \end{cases} \quad (27)$$

**Scenario 2 : When the special order time occurs during the retailer's cycle time**

For the fixed price discount rate  $d_i$ , the first order condition for maximizing  $G_{2i}(T_s)$  in (21) with respect to  $T_s$

$$\frac{dG_{2i}(T_s)}{dT_s} = \left[ x + \frac{C(1-d_i)i\alpha}{\lambda} \right] \frac{\exp(\lambda T_s)}{\exp(\lambda T_s) + \exp(\lambda t_q) - 1} - \frac{C(1-d_i)(\lambda+i)\alpha}{\lambda} \exp(\lambda T_s) = 0 \quad (28)$$

gives  $T_s = T_{s2i}$  (say)

$$T_{s2i} = \frac{1}{\lambda} \ln \left[ \frac{\lambda x + C(1-d_i)i\alpha - C(1-d_i)(\lambda+i)\alpha \exp(\lambda T_s)}{C(1-d_i)(\lambda+i)\alpha} \right] \quad (29)$$

The second order derivative

$$\left. \frac{d^2 G_{2i}(T_s)}{dT_s^2} \right|_{T_s=T_{s2i}} = - \frac{C(1-d_i)(\lambda+i)\alpha}{\exp(\lambda T_s) + \exp(\lambda t_q) - 1} \exp(2\lambda T_{s2i}) < 0$$

suggests that  $G_{2i}(T_{s2i})$  is maximum. Next to ensure that  $Q^* < Q_{s2i}$  i.e.  $T^* < T_{s2i}$ , substitute (29) into this inequality which results in  $T^* < T_{s2i}$  if and only if  $\Delta_{3i} > 0$  (30)

where  $\Delta_{3i} = x - \frac{C(1-d_i)(\lambda+i)\alpha}{\lambda} (\exp(\lambda T^*) + \exp(\lambda t_q) - 1) + \frac{C(1-d_i)i\alpha}{\lambda}$ .

Using (29) into (21) gives the corresponding maximum total cost savings as

$$G_{2i}(T_{s2i}) = \frac{1}{\lambda^2} C(1-d_i)(\lambda+i)\alpha \left[ \ln(\exp(\lambda T_{s2i}) + \exp(\lambda t_q) - 1) - \lambda t_q \right] (\exp(\lambda T_{s2i}) + \exp(\lambda t_q) - 1) - \frac{1}{\lambda^2} C(1-d_i)(\lambda+i)\alpha (\exp(\lambda T_{s2i}) - 1) - A \quad (31)$$



Denote  $G_{2i}(T_{s2i})$  by  $\Delta_{4i}$ . To qualify for special order quantity  $\Delta_{4i} > 0$  otherwise the retailer is advised to opt for the regular order policy. Hence, the optimal value of  $T_{s2i}$  (denoted by  $T_{s2i}^*$ ) for scenario 2 is

$$T_{s2i}^* = \begin{cases} T_{s2i}, & \text{if } \Delta_{3i} > 0 \text{ and } \Delta_{4i} > 0 \\ T^*, & \text{otherwise} \end{cases} \quad (32)$$

The following computational procedure is outlined to calculate the optimal special order cycle time  $T_s^*$  and the optimal special order quantity  $Q_s^*$  for both the scenarios.

**Computational Procedure**

Step 1. If  $q = 0$ , then compute  $T^*$  and go to step 2. Otherwise calculate  $t_q$  from

$$t_q = \frac{1}{\lambda} \ln \left( 1 + \frac{\lambda q}{\alpha} \right), \text{ and go to step 4.}$$

Step 2. For each  $d_i, i = 1, 2, \dots, n$  obtain  $T_{s1i}$  from (24),  $\Delta_{1i}$  from (25) and  $\Delta_{2i}$  from (26). If  $\Delta_{1i} > 0$  and  $\Delta_{2i} > 0$  then substitute  $T_{s1i}$  into (9) and obtain  $Q_{s1i}$ . Check  $Q_{s1i}$  under di. If

(i)  $Q_i \leq Q_{s1i} < Q_{i+1}$ , then  $Q_{s1i}$  is a feasible solution. Set  $Q_{s1i}^* = Q_{s1i}$  and compute  $G_{1i}(T_{s1i}^*)$ .

(ii)  $Q_{s1i} \geq Q_{i+1}$ , then larger price discount rate is possible and thus  $Q_{s1i}$  is not a feasible solution. Set  $G_{1i}(T_{s1i}^*) = -\infty$ .

(iii)  $Q_{s1i} < Q_i$  then set  $Q_{s1i}^* = Q_i$ . Substitute  $Q_{s1i}^*$  into (9) and find  $T_{s1i}^*$  and hence compute  $G_{1i}(T_{s1i}^*)$ . If  $G_{1i}(T_{s1i}^*) > 0$ , go to step 3; otherwise set  $T_{s1i}^* = T^*$ ,  $Q_{s1i}^* = Q^*$  and  $G_{1i}(T_{s1i}^*) = 0$ .

Step 3. Find  $\max_{i=1,2,\dots,n} G_{1i}(T_{s1i}^*)$ . Go to step 6.

Step 4. For each  $d_i, i = 1, 2, \dots, n$  obtain  $T_{s2i}$  from (29),  $\Delta_{3i}$  and  $\Delta_{4i}$ . If  $\Delta_{3i} > 0$  and  $\Delta_{4i} > 0$  then substitute  $T_{s2i}$  into (13) and obtain  $Q_{s2i}$ . Check  $Q_{s2i}$  under di. If

(i)  $Q_i \leq Q_{s2i} < Q_{i+1}$ , then  $Q_{s2i}$  is a feasible solution. Set  $Q_{s2i}^* = Q_{s2i}$  and compute  $G_{2i}(T_{s2i}^*)$ .

(ii)  $Q_{s2i} \geq Q_{i+1}$ , then larger price discount rate is possible and thus  $Q_{s2i}$  is not a feasible solution. Set  $G_{2i}(T_{s2i}^*) = -\infty$ .

(iii)  $Q_{s2i} < Q_i$  then set  $Q_{s2i}^* = Q_i$ . Substitute  $Q_{s2i}^*$  into (9) and find  $T_{s2i}^*$  and hence compute  $G_{2i}(T_{s2i}^*)$ . If  $G_{2i}(T_{s2i}^*) > 0$ , go to step 5; otherwise set  $T_{s2i}^* = 0$ ,  $Q_{s2i}^* = 0$  and  $G_{2i}(T_{s2i}^*) = 0$ .

Step 5. Find  $\max_{i=1,2,\dots,n} G_{2i}(T_{s2i}^*)$ . Go to step 6.

Step 6. Stop.

In the next section, numerical examples are considered to support the proposed problem.

**NUMERICAL EXAMPLES**

Example 1 Consider the following parametric values for the retailer inventory system when the special order is due at the regular order cycle time :  $C = \$ 10 / \text{unit}$ ,  $\alpha = 1000 \text{ units / year}$ ,  $A = \$ 150 / \text{order}$ ,  $i = 30 \% \text{ per annum}$ ,  $\beta = 10 \%$ . Using step 1 of computational procedure, the optimum cycle time  $T^* = 0.271 \text{ years}$  and regular order quantity is  $Q^*$  is 275 units per order. The price discount rate offered by the supplier is given in Table 1.

**Table 1. Price discount rate schedule**

Class	Special order quantity	Discount rate
$I$	$Q_s$	$d_i$
1	$500 \leq Q_s < 1000$	10 %
2	$1000 \leq Q_s < 2400$	20 %
3	$Q_s \geq 2400$	28 %

Using steps 2 and 3, the solution is obtained as given in Table 2.

Table 2. Optimal solutions for Example 1

$d_i$	$Q_{s1i}$	$T_{s1i}^*$	$Q_{s1i}^*$	$G_{1i}^*$
10 %	583	0.567	583	451.17
15 %	765	0.953	1000	733.94
28 %	969	2.151	2400	1072.40

Shaded solution is the optimal solution.

From Table 2, it is observed that the retailer saves \$ 1072.40 by ordering 2400 – units available at the discount rate 28 %.

Example 2. Consider the data as given in example 1 except for  $q$ . Here, we want to validate scenario 2 when the special order time is during the retailer’s cycle time. The optimal ordering policies for  $q = 50, 100$  and  $200$  are given in Table 3.

Table 3. Optimal solutions for Example 2 for different values of  $q$

$q$	$T_{s2}^*$	$Q_{s2}^*$	$G_2^*$
50	2.151	583	757.37
100	2.151	1000	445.16
200	0.953	2400	80.95

From Table 3, it is can be seen that the total cost savings is negatively very sensitive to the remnant inventory. It directs the logistic manager to keep remnant inventory as low as possible when the special order time occurs during the cycle time.

Example 3. In Table 4, we study the effect of changes in the inventory parameters  $C, \alpha, A, i$  and  $\beta$  on the optimal price discount rate, special order quantity and total cost savings. The data is taken as that of Example 2 and  $q = 50$ .

Parameter	Value	$d_i^*$	$Q_{s2}^*$	$G_2^*$
$C$	5.0	0.28	2400	1073.76
	7.5	0.28	2400	945.51
	12.5	0.28	2400	714.65
	15.0	0.28	2400	560.74
$\alpha$	500	0.10	500	474.75
	750	0.20	1000	665.71
	1250	0.28	2400	792.29
	1500	0.28	2400	1024.65
$A$	25.0	0.20	1000	750.61
	37.5	0.20	1000	792.75
	112.5	0.28	2400	1284.68
	225.0	0.28	2400	1482.39
$i$	0.15	0.28	2400	3258.18
	0.25	0.28	2400	1630.89
	0.35	0.20	1000	1018.17
	0.45	0.20	1000	710.47
$\beta$	0.05	0.20	1000	518.41
	0.15	0.28	2400	892.04
	0.20	0.28	2400	915.16
	0.25	0.28	2400	962.80

From Table 4, the retailer has following observations :

- (1) The optimal special order quantity is determining by comparing available price discount to additional holding cost which he will incur. For example, for  $\alpha = 500$  or  $\beta = 5\%$ , the retailer follows the regular order policy. The retailer maximizes his total cost savings by selecting the appropriate price discount rate.
- (2) When demand;  $\alpha$  or ordering cost:  $A$ , are likely to increase, it is advantageous to stock more at a discounted price.
- (3) Increase in holding charge fraction decreases special order quantity and total cost savings.
- (4) Increase in the stock-dependent parameter increases the decision variables resulting more saving in the total cost.
- (5) Increase in the deterioration rate decreases the special order quantity and total cost savings. So retailer should have modern facilities to stock items which are subject to deterioration.

## CONCLUSION

The optimal ordering policy for a retailer is suggested when a supplier offers a temporary price discount if larger order is placed compared to regular one. The demand is stock-dependent and units in inventory are subject to constant deterioration. The optimal policy of special order is determined to maximize the total cost savings. A computational procedure is outlined to determine the appropriate optimal policy. Numerical examples are given to support the theoretical results. A sensitivity analysis is carried out to study the effect of changes in the inventory parameters on the optimal solution. It is advised to the retailer to keep his remnant inventory as low as possible because the contributed holding cost of the remnant inventory is very high. The retailer should opt for the special order quantity when the unit price, market demand and ordering cost are likely to increase. This decision policy will help the retailer to sustain in the competitive market when his demand increases because of display of goods in the showroom.

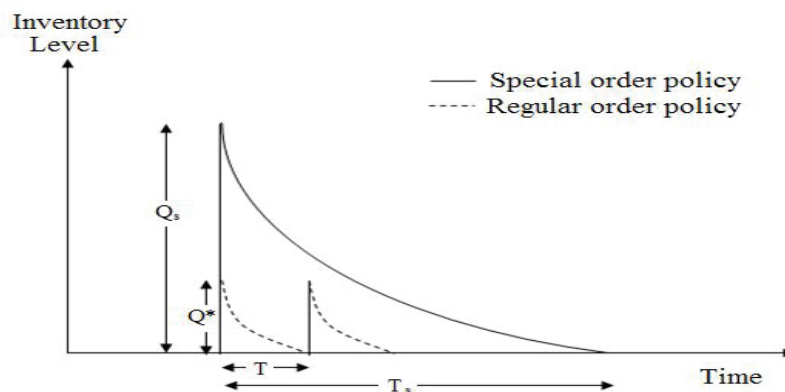
The developed model can be studied to compare various promotional schemes offered by the supplier. This model should be for different demand structures and time dependent deterioration. The effect of inflation can also be incorporated.

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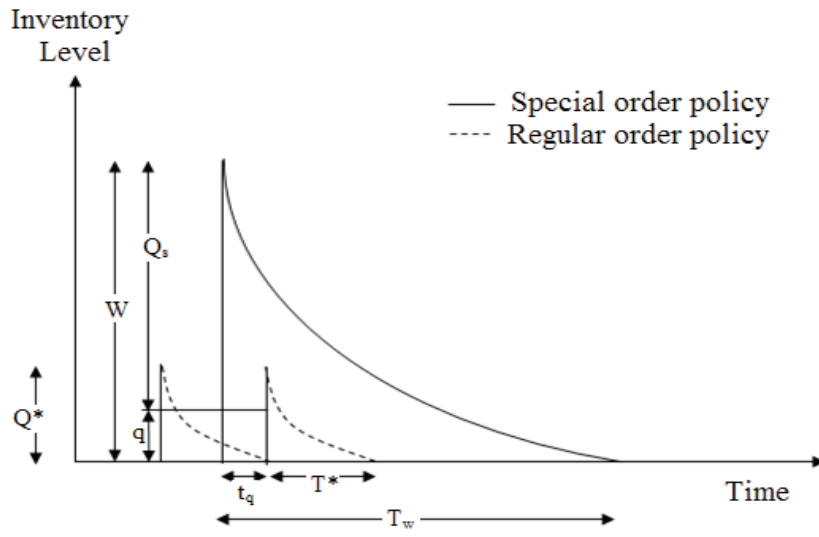
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## Annexure

**Figure 1 Special order time occurs at the retailer's cycle time**



**Figure 2 Special order time occurs during the retailer's cycle time**



# **PERCEPTION OF CUSTOMERS TOWARDS THE MARKETING STRATEGIES ADOPTED BY INDIAN BANKS**

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**Abstract:** In the present Indian Banking Scenario, Marketing Strategies are the important aspect for the customer satisfaction, customer loyalty, Customer Retention, Customer's Image on the part of Bank and Acquisition of new customers. The study examines the relationship between the Marketing strategies with various variables like Reliability, Bank Charges & Interest Rates, Staff Competencies, Communication and Customization. The data was collected from 200 customers of public and private sector banks using the structured interview schedules. The results show that there exist the significant relationship between the variables and certain demographic factors. The results also explain the relationship that exists between the overall general satisfaction and the variable Reliability is highly correlated. Thus the bank must give importance to these variables in order to be effective.

## **INTRODUCTION**

India got independence in 1947 and declared herself as a secular, socialist & democratic republic. Reserve Bank of India (RBI) was set up and banking regulation Act was passed in 1949. The highlight of the act was to bring the RBI under Government control. Another major development took place in the banking sector in the year of 1955 when RBI acquired control of the Imperial Bank of India and renamed it as State Bank of India (SBI). SBI then took over the control of eight private banks managed by princely states and made them 100% subsidiaries. Through mergers and acquisitions the number of banks was reduced from 566 in 1951 to 85 in 1969. Nationalization wave swept through all over country and majority of the banks were nationalized by 1969.

## **MARKETING STRATEGY**

The first step in a review of the development processes involved in formulation marketing strategies is to identify the ends and /or the objectives that have been chosen. These can vary from identification of new products to meeting some emerging customer need(s), enhancing the sales of product to existing customers, bringing new segments under purview, etc. These necessitate answering questions such as:

Where are we today in the marketplace? What is our market share, if any? Where are we making money? What do our customers and prospects need? What should our target market be? What should we choose to provide as value to targeted customers? How do we implement it?

Thus the focus marketing strategy is to effectively allocate and coordinate marketing resources and activities to accomplish the firm's objectives within a specific product-market.

Banks have a large database from which they must cull out information and use it to choose the user groups:

- Identifying potential user, non-users who need to know and are to be persuaded to use a service

- Weaning away some of the customers of other institutions
- Strengthening the loyalty of existing users and developing core business product or service.

Having identified the target groups and their relative strength, one has to choose the branches or places through which distribution can take place. There are branches, particularly in metro or semi-urban and urban centres, that are awfully overcrowded. To launch a new product through such branches would be harmful. It is equally true that branches over a period of time develop an image of their own and it is necessary to build on this image and choose product launch and implementation of marketing policies accordingly.

### **CHANGING CUSTOMER PROFILE**

Over time, customer profile has changed significantly and these changes need to be reviewed before we can proceed further. Some bankers believe that customers shopping round for services are doing something morally wrong. We were schooled in the tradition that if a customer, for reasons of convenience, etc., had to maintain another account he would make the details of such an account available to the bank.

- Customers no longer have the kind of loyalty as was expected in the past
- They are more sophisticated, cost-or price-conscious and are willing to shop around.
- Customer groups are changing also because of longer life span, urbanisation, and higher income amongst middle classes.
- Attitude-wise, customers are less afraid of debts.
- Customers expect a more consultative relationship.

Customers often and quite equivocally express concerns regarding:

- Need for consistent, dependable performance
- Professionalism, skills and standards of performance
- Timeliness of service
- Cordiality and honesty
- Politeness and friendliness of staff
- Safety, security and confidentiality of transactions
- Effective, polite communication

One can attribute almost all specific complaints to a failure of any of the factor mentioned above. It is against this complex mix of enlightened customers and corporations on the one hand and rural and urban poor on the other those banks' marketing plans have to be drawn up. There is a clear need to have marketing strategy as an integral part of corporate plan. Marketing departments must be associated with the planning exercise from the formulation stage and must have a say on branch locations, bank's image building or even on channels of distribution for a given service. Currently, marketing departments in most banks are conspicuous in these deliberations by their absence.

### **REVIEW OF LITERATURE**

Sureshchandear et al. (2003) investigated the critical factors of customer-perceived service quality in the banks of India. The three groups of banks in India (Public sector, Private sector and foreign banks) were compared with respect to each of the five factors of service quality (core services, human element, tangibles of service and social responsibility). Data were collected using the 'personal contact' approach. A total of 452 customers from 51 different banks were ap-

proached, from whom 277 (from 43 banks) valid responses were obtained. The results of confirmatory factor analysis and ANOVA showed that as regards customer perception of service quality, the technological factor (i.e., core service and systematization of the service delivery) contributed more in differentiating the three sector while the people-oriented factor (i.e., human element of service delivery) contributed less to the discrimination. The results also indicated that foreign banks were performing well, followed by private sector banks and public sector banks.

Yavas et al. (2004) investigated the effect of service quality on customer satisfaction, complain behavior and commitment in Turkey. The sample consisted of 156 bank customer. For analysis, three step-wise regression models were run. The results showed that the overall service quality is significant determinant of customer satisfaction, complaint behaviour and commitment.

Kaynak and Harcar (2004) examined the customer satisfaction in banking services of Pennsylvanian (US) commercial banks. A sample of 394 customers was taken for primary survey. For data analysis, t-test and factor analysis were performed. The results showed that banks customer's attitude towards commercial banks were positive. The factors that resulted in customer satisfaction were positive staff attitude, employee professionalism, timely responses to correspondence, confidentiality of the bank, promptness in correcting errors, and providing accurate billing.

Ndubisi and Wah (2005) evaluated the bank-customers relationships and customer satisfaction in Malaysian banking sector. The sample consisted of 220 bank customers and in order to carry out data analysis, factor analysis and step-wise discriminant analyses were used. The results indicated that relationship of customer and bank depends on the bank's competence, commitment, communication, cannot handling and trust, banks that show strong commitment to service and those that are competent, trustworthy, communication efficiently and handling conflicts well would have a better quality relationship with customers, while those that are lacking in these dimensions would create a poor quality relationship with customers.

Koutouvalas and Siomkos (2006) examined the following issues relating to customer satisfaction in Greek banks:

1. The factor shaping Greek banks customers perceptions of service quality
2. Direct influence of perceptions on customer loyalty' customer perceptions and switching intentions among public and private bank customers

A sample of 200 customers was taken for primary survey. The results of regression analysis showed that, there was a direct and positive correlation between perceive service quality and customer loyalty in the case of both private and the public sectors banks, significant relationship was recorded between demographic characteristic and perceived quality of both types of banks. Customers of both the banks were willing to express their complaints to banks employees. Thus, bank employees were the bank agents and were acting as the connecting link between banks and customers. Customer loyalty was related only to educational level since a higher educational level was related to an increased tendency for information search regarding competitive product/services/providers. Bank's promotional efforts, aimed at providing relevant information to the public might increase loyalty level. In such promotional efforts, the service quality and the reputation were the main areas to be emphasized.

Roig et al., (2006) analyzed the dimensionally of the concept of customer's perceived value in the banking sector of Spain. A total of 200 customers were selected for survey. The result of confirmatory factor analysis and linear regression analysis indicated that customers perceived value in banking sector composed of six dimensions; functional value of the establishment. Functional value of the personnel, functional value of the service, functional value of price emotional value and social value.



Manrai and Manarai (2007) investigated the overall dimensions of customer satisfaction with bank services in the US. The sample comprised of 578 respondents and for measurement of customer's satisfaction factor analysis technique was used. The study identified four overall dimensions of customer satisfaction. These were personnel related considerations financial considerations and convenience related considerations (ATM and hours). The findings suggested that bank marketers should pay much more attention towards promoting factors like personnel, atmospherics, and convenience than what was done in the past. This would help the banks in differentiating their offerings in customers' perceptions and thus attracting them from the competitors.

### **OBJECTIVES**

- To know the factors that influence the marketing strategies of Banks
- To know the level of satisfaction on part of the customers towards the functional and CRM Strategies
- To find out customer preference towards various banking facilities.

### **SCOPE**

- The survey is confined to opinion survey about the various facilities provided by the Bank's at Trichy.
- The study also involves in identifying and analyzing the purpose of Marketing Strategies and its various features.

### **LIMITATIONS**

- The survey has been conducted only on 200 respondents.
- Unwillingness of some respondents to provide information is another limitation.
- Findings of the study may be influenced by personal bias of the respondents.

### **RESEARCH METHODOLOGY**

#### **Problem Statement:**

The bank has been offering various Marketing Strategies like Functional, CRM and promotional Strategies etc. This project attempts to find out the performance of the above said strategies by the banks and the level of customer perception towards it.

#### **Research Design:**

In this study the researchers used the descriptive design.

#### **Sample technique and Size:**

Sampling is a technique or a method of selection of samples. Convenient sampling method is used. The researchers have taken 200 samples.

#### **Sampling Area:**

This study was undertaken in Trichy city.

#### **Method of Data Collection:**

Data collection for this study consists of

**Primary sources of data** collected through structured questionnaire by way of personal interview. The primary data are those that are collected a fresh and for the first time and this happens to be original in character.

**Secondary sources of data** collected through magazines, journals and website

**Tools Used**

- Chi- Square Analysis
- Correlation

**DATA ANALYSIS AND INTERPRETATION**

The data has been collected with the help of questionnaire. And it has been analyzed and interpreted with the help of tables along with relevant descriptions. Appropriate treatment has been done to the raw data and logical conclusions are drawn based on the findings.

**Table 1: Demographic variables**

Demographic Variables	No of Respondents	Percentage
Sex		
Male	124	62
Female	76	38
Age		
18-25	72	36
26-35	76	38
36-45	12	6
46-60	24	12
60 & above	16	8
Marital Status		
Married	108	54
Unmarried	92	46
Educational Level		
Below 10th	24	12
Below 12th	24	12
Graduation	76	38
Post Graduation	24	12
Professional	52	26
Status & Occupation		
Salaried	60	
Businessman/self employed	52	30
Student	56	26
Housewife	24	28
Others	8	12
		4
Monthly Income (Rs)		
Below 10,000	36	18
100001-15000	28	14
15001-20000	68	34
20001-25000	16	8
Above 25000	52	26

**Table 2: Most Frequented bank with which you have maximum no. of Transaction**

Most Frequently used Bank	No of Respondents	Percentage
	32	
ICICI	32	16
Indian Bank	32	16
SBI	84	42
IOB	16	8
HDFC	12	6
Dena Bank	4	2
Canara Bank	4	2
Punjab National Bank	8	4
Karur vysya Bank	8	4

Based on this survey, the usage percentage is identified as ICICI 16%, Indian Bank 16%, SBI 42%, IOB 8%, HDFC 6%, Dena Bank 2%, Canara Bank 2%, Punjab National Bank 4% and Karur vysya Bank 4%.

**Table 3: Reason for selecting the Most frequently used Bank**

Reason for selecting the Most Frequently used Bank	No of Respondents	Percentage
Location convenience	104	52.0
Availability of online bank	8	4.0
Better service & friendly staff	8	4.0
Greater spread of ATMs	4	2.0
Infrastructure	28	14.0
Banks image	16	8.0
Customization	32	16.0
Total	200	100.0

With the view to identify the reason for selecting the most frequented bank can be inferred from table 3. From the above it is clear that 52% of the respondent prefers for location convenience, 16% prefers for Bank customization, 14% is for Infrastructure Facilities, 8% is because of Bank Image, 4% is for Online Banking and Friendly staff and only 2% is for greater speed for ATM.

**Table 4: Ranking the factors of Importance as per the respondent's preference**

Rank	Bank Charges & Interest Rates		Staff Competencies		Reliability		Customization		Communication	
	n	%	n	%	N	%	n	%	N	%
1 <sup>st</sup>	148	74	28	14	16	8	8	4	20	10
2 <sup>nd</sup>	20	10	64	32	32	16	64	32	20	10
3 <sup>rd</sup>	8	4	20	10	44	22	48	24	100	50
4 <sup>th</sup>	12	6	52	26	56	28	40	20	20	10
5 <sup>th</sup>	12	6	36	18	52	26	40	20	40	20

From the above table it is inferred that 74% of the respondents provides I rank to Bank Charge and Interest Rates, 14 % of the respondent provide I rank to Staff Competencies, 10% of the respondents provide I rank to communication, and only 4% of the respondent provide I rank to the Reliability and to customization of the Banking Services.

**Table 5: Distribution of the respondents and their overall general satisfaction**

Sl.no	Particulars	No.of respondents (n=200)	Percentage (100%)
1	Low	100	50
2	High	100	50
Mean: 15.28/ Median: 15.50/ S.D.: 4.095 / Min.: 9 / Max.: 22			

**Table 6: Association between Gender of the respondents and their Bank Charges**

Sl. no	Gender	Bank Charges and Interest Rates				Disagree	Statistical inference
		Disagree	Neither Disagree nor Agree	Agree	Strongly Agree		
1	Male	20	13	66	25	124	X <sup>2</sup> =.017 P < 0.05 Significant
2	Female	12	8	40	16	76	

The above table shows that there is a significant association between gender of the respondents with the Bank Charges and Interest rates. Since the calculated value is lesser than table value.

**Table 7: Education level and the Services provided by the banks**

Sl.no	Educational level	Services provided by the banks				Statistical inference
		Unlikely (n=20)	Moderate (n=20)	Likely (n=120)	Extremely likely (n=40)	
1	10th	4 (20%)	4 (20%)	12 (10%)	4 (10%)	X <sup>2</sup> =0.009 P < 0.05 Significant
2	12th	0	0	16 (13.3%)	8 (20%)	
3	graduate	4 (20%)	12 (60%)	56 (46.7%)	4 (10%)	
4	post graduate and above	0	0	16 (13.3%)	8 (20%)	
5	professional	12 (60%)	4 (20%)	20 (16.7%)	16 (40%)	

The above table shows that there is a significant association between the Educational level of the respondents and the Services provided by the banks. Since the calculated value is lesser than table value.

**Table 8: Occupation with Facilities**

Sl. no	Occupation	Occupation with Facilities				Statistical inference
		Unlikely (n=20)	Moderate (n=20)	Likely (n=120)	Extremely likely (n=40)	
1	salaried	4 (20%)	8 (40%)	44 (36.7%)	4 (10%)	X <sup>2</sup> = 0.033 P < 0.05 Significant
2	businessman / self employed	12 (60%)	0	28 (23.3%)	12(30%)	
3	student	0	4 (20%)	40 (33.3%)	12 (30%)	
4	house wife	4(20%)	4 (20%)	8 (6.7%)	8 (20%)	
5	others	0	4 (20%)	0	4 (10%)	

The above table shows that there is a significant association between the Occupational level of the respondents and the Facilities provided by the banks. Since the calculated value is lesser than table value.

**Table 9: Monthly income in rupees and the services provided by the banks**

Sl. no	Monthly income	when you have a routine bank transaction to do how likely will you use atm				Statistical inference
		Unlikely (n=20)	Moderate (n=20)	Likely (n=120)	Extremely likely (n=40)	
1	<10000	4 (20%)	8 (40%)	20 (16.7%)	4 (10%)	X <sup>2</sup> =0.000 P < 0.05 Not Significant
2	10001-15000	0	4 (20%)	16 (13.3%)	8 (20%)	
3	15001-20000	8 (40%)	0	44 (36.7%)	16(40%)	
4	20001-25000	4 (20%)	0	8 (6.7%)	4 (10%)	
5	>25000	4 (20%)	8(40%)	32(26.7%)	8 (20%)	

The above table shows that there is a significant association between the Monthly Income of the respondents and the services provided by the banks. Since the calculated value is lesser than table value.

**Table 10: Correlations**

	Bank Charges & Interest Rates	Staff Competencies	Communication	Customization	Reliability	Overall general satisfaction
Bank Charges and Interest Rates	1					
Staff Competencies	.661(**)	1				
Communication	.512(**)	.462(**)	1			
Customization	.381(**)	.422(**)	.254(*)	1		
Reliability	.496(**)	.430(**)	.482(**)	.570(**)	1	
Overall general satisfaction	.786(**)	.780(**)	.705(**)	.706(**)	.807(**)	1
N	200	200	200	200	200	200

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

In this study, Marketing Strategy is treated as the independent or Predictor variable and Functional Strategies & CRM strategies are treated as the dependent or Criterion variable. In order to examine the relationship between variables, Correlation is calculated. The results showed that there is a positive relationship between the Functional Oriented Strategy factors (Bank Charges and Interest Rates, Staff Competencies and Reliability,) and CRM factors (Customization and communication) respectively. The result does not show any negative relationship between the variables. Multi collinearity among the variables were found as the variables Overall General Satisfaction and Reliability are highly correlated. ( $> 0.80$ ). This shows that all the variables are independent though related with each other.

## **CONCLUSION**

The customers selected the banks on the basis of Location convenience, Availability of online bank, Better service & friendly staff, Greater spread of ATMs, Infrastructure,

Bank's image, Customization and interest rate provided to them, Thus on the basis of the service quality, Marketing Strategies adopted by the banks and on the performance of the banks, the customer will select the prompt one. The same was argued by Paramusraman, zeithmal and Berry(1988),the service quality, as the consumer's comparison between customers' expectations and performance and the service quality is determined by the customer perceptions towards it. Samli & Frohlich, (1992); sudesh, (2007) said that Delivering quality service to customer is one of the ways for banks to respond and compete for success and survival. The customer satisfaction was developed on the basis of a number of scales developed by many authors (Walter, Muller, Helfert & Ritter, 2003; Fornell,1992; Ganesan,2007) Weitz and Wensley (1988), they define marketing strategy as an indicator that is specific towards which activities are to be targeted and the types of competitive advantages that are to be developed and exploited. Here the target group is the customers of both private sector and private sect and the type of competitive advantage adopted by these banks are comfortable Bank Charges and Interest Rates, Staff Competencies, better Communication, Customization, Reliability and Easy accessibility.

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# **WILL THE INDIAN CUSTOMERS CONSIDER A SHIFT IN BANKING SERVICES TO ISLAMIC BANKING? A STUDY IN MUMBAI**

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**Abstract:** The global financial tsunami and economic recession of 2008 led to the collapse of the Lehman Brother, Bank of Wachovia and many other century old investment titans. This financial apocalypse made the bankers; financial institutions and banking customers consider Islamic banking as a possible alternate to conventional banking. As of today there are many conventional banks that are marketing Islamic banking products and services.

This research is a study of the prospects of Islamic banking in a developed, secular and modern country like India, with special reference to the city of Mumbai. The study attempts to evaluate whether the Indian customers may consider a shift to Islamic Banking products and services from their present conventional banking services.

The data collected through the questionnaire was analyzed using descriptive analysis, Non-parametric Friedman's Test and cross tabulations. The results revealed that customers have positive attitude on shifting their preference to Islamic banking services. Limited knowledge on the Islamic Banking system was a critical factor that deterred customers from shifting to Islamic banking services. This needed to be addressed to ensure sustainable growth of Islamic Banking along with commercial banking.

## **INTRODUCTION**

Banking is the lifeblood of an economy. Banking services are availed by and essential for everyone irrespective of the class of individuals. Banking organizations provide customers with such services and products that cannot be dispensed with, everyone including those migrating to the urban area of the country from distant places must have access to banking so as to transfer their income to the families in distant parts of the country. All these Banking services have made banking an inevitable part of our economy.

The pioneering effort of establishing interest-free institutions was initiated by a welfare organization that collected contribution and the hides of animals sacrificed during rituals from the public and made available interest-free loans to the marginalized and underprivileged. The Indian banking sector made many positive contributions in the last ten years. The policy makers, which comprise the Reserve Bank of India (RBI), Ministry of Finance and related government and financial sector regulatory entities, have made several notable efforts to improve regulation in the sector. The Global crisis has made the Indian regulators open their minds to Islamic Banking.

## **OBJECTIVES**

To identify the factors which influence the customer's preference of conventional and Islamic banking services?

- To suggest methods to promote Islamic Banking Services in India.

## **DATA COLLECTION AND METHODOLOGY**

The data Collection comprised of three key initiatives online Detailed Questionnaires to cross section customers in Mumbai who use the Banking Facility and In-depth interviews with Bank Managers. The Data obtained from questionnaires was transformed to SPSS compatible data form. The data was analyzed using descriptive analysis, Non- Parametric Friedman's Test and

Cross Tabulations across gender, age and occupation of the respondents to identify the significant marketing characteristics of Islamic banks and Conventional banks in India.

**DATA ANALYSIS AND FINDINGS**

The Data Analysis is based on the responses received from the corresponding questionnaire circulated to respondents, who were the customers of both Private sector Indian Commercial banks as well as Public sector Indian commercial banks in the city of Mumbai. Though the sample pool is quite small, the discussions gauge the perceptions and views of customers about conventional banking products vis-à-vis Islamic banking, given the very limited number of Islamic banking products in Mumbai.

The descriptive Analysis of demographic profile using frequency modulation across the gender, age, occupation and present banking services was conducted results summarized in Table1.

Table 1 – Descriptive demographic Statistics						
		Type	Gender	Age	Occupation	Services
N	Valid	27	27	27	27	27
	Missing	0	0	0	0	0
Mean		1.41	.48	2.44	2.53	2.00

On the basis of the output from the test it can be observed that all i.e 100% of the respondents were presently using the conventional banking services, however it was thought-provoking to observe that few of the customers did consider the shift from conventional banking to Islamic banking although they were satisfied with the conventional banking services that their respective banks provided. An analysis on the gender preference on banking services suggested that the male customers would consider using Islamic banking products and services over female customers, if given the correct and relevant information and advice on the same. Also when it comes to the preference of Islamic banking products and services based on age of customers it can be observed that the Islamic banking products can be targeted to that set of banking customers within the age group of 31-40 years of age. Another variable that was considered in the present study was whether the type of occupation influences the preference of the banking services. It was observed that the self employed Male businessman would consider and agreed the shift to Islamic banking services from the present conventional banking services.

In order to assess the individual’s preference to the various reasons of their association to a bank, the respondents were asked to rank each of the six reasons of their association with a bank in ascending order of preference, with 1 being most preferred choice of product. The non parametric- Friedman Test was conducted to examine if there was any significant difference in the ranking given by the customers.

**Testing of hypothesis:**

H0: There is no significant difference in the rankings given by respondents

H1: There is significant difference in the rankings given by respondents.

Based on the results Friedman’s Test conducted for H0 and H1, where asymp sig<0.05, reject the null hypothesis H0, results summarized in Table 2.

<b>Table 2 - Friedman Test Statistics</b>	
N	27
Chi-Square	31.804
Df	5
Asymp. Sig.	.000

Thus there is a significant difference in the ranking given by customers for the various reasons of their association with their bank at present. Based on the results of the Friedman's Test it can be observed in Table 3 and Table 4.

<b>Table 3: Friedman Test Descriptive Statistics</b>					
	N	Mean	Std. Deviation	Minimum	Maximum
Association Investment	27	3.96	.649	2	5
Association Saving	27	3.70	1.068	2	5
Association Salary	27	3.96	2.504	1	6
Association Borrowing	27	4.00	1.710	1	6
Association Cheque and ECS	27	1.67	.734	1	3
Association Phone Internet Banking	27	3.70	1.613	1	6

<b>Table 4: Reason for association with a bank- Ranks</b>	
	Mean Rank
Association Investment	3.96
Association Saving	3.70
Association Salary	3.96
Association Borrowing	4.00
Association Cheque and ECS	1.67
Association Phone Internet Banking	3.70

As observed in Table 4, on the basis of the outcome of the Friedman test, customers have ranked association with a bank for cheque clearing and ECS facility as the primary reason of association with a bank, the next reason of association with the bank is Savings and Phone and Internet banking that have been given preference over Reason of Investments and Salary accounts. The customers rate borrowings as the last reason for associating themselves with a bank. This also meets one of the Islamic Banking principles of Qard Hassan (Good loan).

The data obtained through questionnaires was also cross tabulated across the Age, Gender and Occupation of the respondents. When cross tabulation across the gender was analyzed it was observed that whilst amongst Female, 30% of the Female agree that they understand the Shariah principles in Table 5, only 14% amongst the Male respondents agreed that they understand the Shariah principles. Finally amongst those that agree that they understand the Shariah principles



67% are Female and 33% are Male, as in Table 5. In spite of the fact that 67% of women agree that they understand the Shariah principles, only 45% of Women support the Shariah principle as in Table 6 and interestingly only 42% of them agree to shift their preference to Islamic Banking services from conventional Banking services that they are presently using by transferring their funds to Islamic Banking account as in Table 7. Interestingly, although only 33% of males agree that they understand the Islamic Principles, 55% of Males support the Shariah principles as in Table 6 and 58% as in Table 7 of them agree to transfer their funds to Islamic banking accounts and explore the use of Islamic Banking facility.

**Table 5: Cross tabulation of gender across understanding the Shariah concept.**

Table- 05. Crosstabulation of gender across understanding the Shariah concept

			Understand_Shariah_concept			Total
			Strongly Disagree	Disagree	Agree	
Gender	Female	Count	5	4	4	13
		% within Gender	38.5%	30.8%	30.8%	100.0%
		% within Understand_Shariah_concept	38.5%	50.0%	66.7%	48.1%
		% of Total	18.5%	14.8%	14.8%	48.1%
	Male	Count	8	4	2	14
		% within Gender	57.1%	28.6%	14.3%	100.0%
		% within Understand_Shariah_concept	61.5%	50.0%	33.3%	51.9%
		% of Total	29.6%	14.8%	7.4%	51.9%
Total	Count	13	8	6	27	
	% within Gender	48.1%	29.6%	22.2%	100.0%	
	% within Understand_Shariah_concept	100.0%	100.0%	100.0%	100.0%	
	% of Total	48.1%	29.6%	22.2%	100.0%	

**Table 6: Cross tabulation of gender across supporting the Shariah principles**

Table 06 - Cross tabulation of gender across supporting Shariah principles

			Support_Shariah				Total
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Gender	Female	Count	6	2	0	5	13
		% within Gender	46.2%	15.4%	.0%	38.5%	100.0%
		% within Support_Shariah	100.0%	28.6%	.0%	45.5%	48.1%
		% of Total	22.2%	7.4%	.0%	18.5%	48.1%
	Male	Count	0	5	3	6	14
		% within Gender	.0%	35.7%	21.4%	42.9%	100.0%
		% within Support_Shariah	.0%	71.4%	100.0%	54.5%	51.9%
		% of Total	.0%	18.5%	11.1%	22.2%	51.9%
Total	Count	6	7	3	11	27	
	% within Gender	22.2%	25.9%	11.1%	40.7%	100.0%	
	% within Support_Shariah	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	22.2%	25.9%	11.1%	40.7%	100.0%	

**Table 7: Cross tabulation of gender across transfer of funds**

Table - 07 Tabulation of Gender across transfer of funds

			Transfer_funds_to_islamic				Total
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Gender	Female	Count	3	5	0	5	13
		% within Gender	23.1%	38.5%	.0%	38.5%	100.0%
		% within Transfer_funds_to_islamic	100.0%	50.0%	.0%	41.7%	48.1%
		% of Total	11.1%	18.5%	.0%	18.5%	48.1%
	Male	Count	0	5	2	7	14
		% within Gender	.0%	35.7%	14.3%	50.0%	100.0%
		% within Transfer_funds_to_islamic	.0%	50.0%	100.0%	58.3%	51.9%
		% of Total	.0%	18.5%	7.1%	26.0%	61.0%
Total	Count	3	10	2	12	27	
	% within Gender	11.1%	37.0%	7.4%	44.4%	100.0%	
	% within Transfer_funds_to_islamic	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	11.1%	37.0%	7.4%	44.4%	100.0%	

When the data was cross tabulated with gender across those who would consider Islamic banking as an alternative to commercial banking as suggested in Table 8.

**Table 8 : Cross Tabulations of gender across consider Islamic banking as an alternative to conventional banking**

			Islamic_alternative_to_conventional				Total
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Gender	Female	Count	6	2	4	1	13
		% within Gender	46.2%	15.4%	30.8%	7.7%	100.0%
		% within Islamic alternative to conventional	100.0%	18.2%	44.4%	100.0%	48.1%
		% of Total	22.2%	7.7%	14.8%	3.7%	48.1%
	Male	Count	0	9	5	0	14
		% within Gender	.0%	64.3%	35.7%	.0%	100.0%
		% within Islamic alternative to conventional	.0%	81.8%	55.6%	.0%	51.9%
		% of Total	.0%	33.3%	18.5%	.0%	51.9%
Total	Count	6	11	9	1	27	
	% within Gender	22.2%	40.7%	33.3%	3.7%	100.0%	
	% within Islamic alternative to conventional	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	22.2%	40.7%	33.3%	3.7%	100.0%	

that amongst Female only 8% Female and amongst male , 0% male consider that Islamic banking can be an alternative to conventional banking. Overall amongst those who agree that Islamic banking can be alternative to conventional banking, Female respondents strongly disagreed with this view. Table 9, suggest that 100% Female, amongst female respondents and 100% of Male amongst male respondents, either disagreed or strongly disagreed that they would continue using the Islamic Banking products even if they were not provided interest on deposits. Amongst those who strongly disagreed 85% were Female and 15% were male, and amongst those who disagreed 14% were Female and 86% were male as in Table 9.

The cross tabulations across age of the respondents as depicted in Table 10, emphasizes that amongst those who agree that they understand the Shariah concept are in the age group 31-40 years with 67% of the respondents being in this age group and 33% of the respondents in the age group 41-50 years of age.

**Table 9: Cross Tabulation of gender with using Islamic banking even if unable to service interest on deposit**

Cross tabulation of Gender with using Islamic banking even if unable to service interest on deposits

			Continue with IB even if unable interest		Total
			Strongly Disagree	Disagree	
Gender	Female	Count	11	2	13
		% within Gender	84.6%	15.4%	100.0%
		% within Continue with IB_even_if_unable_interest	84.6%	14.3%	48.1%
	Male	Count	2	12	14
		% within Gender	14.3%	85.7%	100.0%
		% within Continue with IB_even_if_unable_interest	15.4%	85.7%	51.9%
Total	Count	13	14	27	
	% within Gender	48.1%	51.9%	100.0%	
	% within Continue with IB_even_if_unable_interest	100.0%	100.0%	100.0%	
	% of Total	48.1%	51.9%	100.0%	

However, when analyzed as to that age group that Support the Shariah principles it was observed in Table 11 that the age groups i.e, 31-40 years as well as 41-50 years, only 36% of each of the population in the respective age groups supported the Shariah principles. It was also interesting to observe in Table 19, that 72% of the respondents in the age group 31-40 years of age and 18% in the age group 41-50 years, disagreed that Islamic Banking can be viewed as alternate to commercial Banking.

The respondents agreed that when it comes to selecting the banking services Economics is the key consideration It can also be observed in Table 12 A and Table 12 B that, when it comes to complete shifting services to Islamic banking by transferring funds from conventional banking to Islamic banking, 67% of respondents in age group 31-40 years and 33% of respondents in age group 41-50 years, disagree to the idea of transferring their funds and using Islamic banking facility if provided.

**Table 10- Cross tabulation of Age across understanding Shariah concept**

Cross tabulation of Age across Understanding Shariah concepts.

			Understand_Shariah_concept			Total
			Strongly Disagree	Disagree	Agree	
Age	51-60	Count	0	2	0	2
		% within Age	.0%	100.0%	.0%	100.0%
		% within Understand Shariah concept	.0%	25.0%	.0%	7.4%
	41-50	Count	4	3	2	9
		% within Age	44.4%	33.3%	22.2%	100.0%
		% within Understand Shariah concept	30.8%	37.5%	33.3%	33.3%
	31-40	Count	9	2	4	15
		% within Age	60.0%	13.3%	26.7%	100.0%
		% within Understand_Shariah_concept	69.2%	25.0%	66.7%	55.6%
	18-30	Count	0	1	0	1
		% within Age	.0%	100.0%	.0%	100.0%
		% within Understand_Shariah_concept	.0%	12.5%	.0%	3.7%
	Total	Count	13	8	6	27
		% within Age	48.1%	29.6%	22.2%	100.0%
		% within Understand_Shariah_concept	100.0%	100.0%	100.0%	100.0%
% of Total		48.1%	29.6%	22.2%	100.0%	

**Table 11: Cross tabulation of Age across those who support the Shariah Principles**

Cross tabulation of Age across those who support the Shariah Principles.

		Support_Shariah				Total
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Age	51-60	Count	0	0	0	2
		% within Age	.0%	.0%	.0%	100.0%
		% within Support_Shariah	.0%	.0%	.0%	18.2%
41-50	Count	3	2	0	4	9
		% within Age	33.3%	22.2%	.0%	44.4%
		% within Support_Shariah	50.0%	28.6%	.0%	36.4%
31-40	Count	3	5	3	4	15
		% within Age	20.0%	33.3%	20.0%	26.7%
		% within Support_Shariah	50.0%	71.4%	100.0%	36.4%
18-30	Count	0	0	0	1	1
		% within Age	.0%	.0%	.0%	100.0%
		% within Support_Shariah	.0%	.0%	.0%	9.1%
Total	Count	6	7	3	11	27
		% within Age	22.2%	25.9%	11.1%	40.7%
		% within Support_Shariah	100.0%	100.0%	100.0%	100.0%
		% of Total	22.2%	25.9%	11.1%	40.7%

**Table No 12A: Cross tabulation of Age across views whether Islamic banking can be alternative to conventional banking**

Cross Tabulation of Age across views whether Islamic banking can be alternate to conventional banking

		Islamic_alternative_to_conventional				Total
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
41-50	Count	3	2	4	0	9
		% within Age	33.3%	22.2%	44.4%	.0%
		% within Islamic alternative_to_conventional	50.0%	18.2%	44.4%	.0%
31-40	Count	3	8	3	1	15
		% within Age	20.0%	53.3%	20.0%	6.7%
		% within Islamic alternative_to_conventional	50.0%	72.7%	33.3%	100.0%
Total	Count	6	11	9	1	27
		% within Age	22.2%	40.7%	33.3%	3.7%
		% within Islamic alternative_to_conventional	100.0%	100.0%	100.0%	100.0%
		% of Total	22.2%	40.7%	33.3%	3.7%

**Table No 12B: Cross tabulation of Age across transfer of funds to Islamic Banking**

Cross tab of Age across transfer of funds to Islamic Banking

		Transfer_funds_to_islamic banking				Total
		Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
41-50	Count	1	4	0	4	9
		% within Age	11.1%	44.4%	.0%	44.4%
		% within Transfer funds_to_islamic	33.3%	40.0%	.0%	33.3%
31-40	Count	2	6	2	5	15
		% within Age	13.3%	40.0%	13.3%	33.3%
		% within Transfer_funds_to_islamic	66.7%	60.0%	100.0%	41.7%
Total	Count	3	10	2	12	27
		% within Age	11.1%	37.0%	7.4%	44.4%
		% within Transfer_funds_to_islamic	100.0%	100.0%	100.0%	100.0%
		% of Total	11.1%	37.0%	7.4%	44.4%

The Cross Tabulation across the occupation of the respondents was also conducted, the results with respect to class of occupation that supported the Shariah principle is seen in Table 13,

It is observed that the entire salaried employee class of respondents does not agree to support the Shariah principle, whereas 27% of professional and 72% of self employed businessmen agree to support the Shariah principle. Thus it can be concluded that the Islamic Banking products can be marketed to this class of customers.

**Table 13- Cross tabulation of Occupation across supporting Islamic Shariah principle**

			Support Shariah				Total
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Occupation	Salaried	Count	6	2	3	0	11
		% within Occupation	54.5%	18.2%	27.3%	.0%	100.0%
		% within Support_Shariah	100.0%	28.6%	100.0%	.0%	40.7%
		% of Total	22.2%	7.4%	11.1%	.0%	40.7%
	Professional	Count	0	2	0	3	5
		% within Occupation	.0%	40.0%	.0%	60.0%	100.0%
		% within Support_Shariah	.0%	28.6%	.0%	27.3%	18.5%
		% of Total	.0%	7.4%	.0%	11.1%	18.5%
	self employed businessman	Count	0	3	0	8	11
		% within Occupation	.0%	27.3%	.0%	72.7%	100.0%
		% within Support_Shariah	.0%	42.9%	.0%	72.7%	40.7%
		% of Total	.0%	11.1%	.0%	29.6%	40.7%
Total	Count	6	7	3	11	27	
	% within Occupation	22.2%	25.9%	11.1%	40.7%	100.0%	
	% within Support_Shariah	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	22.2%	25.9%	11.1%	40.7%	100.0%	

However on investigation if Islamic banking can be viewed as an alternate to conventional banking, Table 14 suggests that the salaried class of occupation strongly disagree to this view, whereas 67% of the self employed businessmen are of the view that they neither agree nor disagree to this. The self employed businessmen are the class of occupation that otherwise support the Shariah concept, and now they are not sure if they can consider Islamic banking as alternate to conventional banking.

**Table 14- Cross tabulation occupation across Islamic banking alternate to conventional banking**

			Islamic alternative to conventional				Total
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	
Occupation	Salaried	Count	6	4	1	0	11
		% within Occupation	54.5%	36.4%	9.1%	.0%	100.0%
		% within Islamic_alternative_to_conventional	100.0%	36.4%	11.1%	.0%	40.7%
		% of Total	22.2%	14.8%	3.7%	.0%	40.7%
	Professional	Count	0	3	2	0	5
		% within Occupation	.0%	60.0%	40.0%	.0%	100.0%
		% within Islamic_alternative_to_conventional	.0%	27.3%	22.2%	.0%	18.5%
		% of Total	.0%	11.1%	7.4%	.0%	18.5%
	self employed businessman	Count	0	4	6	1	11
		% within Occupation	.0%	36.4%	54.5%	9.1%	100.0%
		% within Islamic_alternative_to_conventional	.0%	36.4%	66.7%	100.0%	40.7%
		% of Total	.0%	14.8%	22.2%	3.7%	40.7%
Total	Count	6	11	9	1	27	
	% within Occupation	22.2%	40.7%	33.3%	3.7%	100.0%	
	% within Islamic_alternative_to_conventional	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	22.2%	40.7%	33.3%	3.7%	100.0%	

**Table 15 - Cross tabulation of occupation across transfer of funds to Islamic banking**

			Transfer funds to islamic				
			Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Total
Occupation	Salaried	Count	1	7	2	1	11
		% within Occupation	9.1%	63.6%	18.2%	9.1%	100.0%
		% within Transfer_funds_to_islamic	33.3%	70.0%	100.0%	8.3%	40.7%
		% of Total	3.7%	25.9%	7.4%	3.7%	40.7%
	Professional	Count	2	0	0	3	5
		% within Occupation	40.0%	.0%	.0%	60.0%	100.0%
		% within Transfer_funds_to_islamic	66.7%	.0%	.0%	25.0%	18.5%
		% of Total	7.4%	.0%	.0%	11.1%	18.5%
	self employed businessman	Count	0	3	0	8	11
		% within Occupation	.0%	27.3%	.0%	72.7%	100.0%
		% within Transfer_funds_to_islamic	.0%	30.0%	.0%	66.7%	40.7%
		% of Total	.0%	11.1%	.0%	29.6%	40.7%
Total	Count	3	10	2	12	27	
	% within Occupation	11.1%	37.0%	7.4%	44.4%	100.0%	
	% within Transfer_funds_to_islamic	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	11.1%	37.0%	7.4%	44.4%	100.0%	

It was observed in Table 15 that 66% of professional self employed businessmen agreed to transfer their funds to Islamic banking account and explore their services. However, amongst salaried employees only 8% of them agreed to attempt to explore the Islamic banking services, and only 25% of professionals were of the positive opinion to transfer their funds to Islamic Banks from their present conventional banks. This showed that salaried respondents were skeptical on the transfer of funds and use of Islamic banking services lection of banking services by all the class of occupation.

As of today the result explained that the customers opt for banking services because of the convenience factor, this is seen in the Conventional banking customers who choose this banking service because of the service quality. The findings give way that most of the respondents have positive insight and are willing to accept Islamic products and services. However, they lack the relevant knowledge and education on the Islamic banking principle. Thus if the employees are well equipped with knowledge to handle their customers and to perform their duties, automatically this will lead to informed customers.

The respondents were looking ahead for the Islamic banking products, but were also sure that they preferred these products in a phase manner. In order to assess the individual's preference to the various products of Islamic Banking, the respondents were asked to rank each of the products in ascending order of preference, with 1 being most preferred choice of product. The non parametric- Friedman Test was conducted to examine if there was any significant difference in the ranking given by the customers.

**TESTING OF HYPOTHESES**

H0: There is no significant difference in the preference given by respondents

H2: There is significant difference in the preference given by respondents.

Based on the results Friedman's Test conducted for H0 and H2, where asymp sig<0.05, reject the null hypothesis H0, results summarized in Table 16

Since there is a significant difference in preference given by respondents, based on the results of the Friedman's test as in Table 17 the following can be observed.

<b>Table 17- Preference for Islamic Banking services</b>	
	Mean Rank
PrincipleMusharakah	5.33
PrincipleMudharabah	2.37
PrincipleHibah	5.22
PrincipleWadiah	2.22
PrincipleMurabahah	3.30
PrincipleIjarah	6.74
PrincipleQard_Hassan	2.81

The above shows , respondents prefer the products based on principle of Wadiah ( safekeeping) , followed by products based on the principle of Mudharabah , next Qard Hassan ( Good loan), Next in their line of preference is products based on Murabahah ( profit element), last in the list of preference was products based on Principle of Musharakah ( Joint venture) and principle of Ijarah ( Leasing).

## **CONCLUSION**

Finally, in conclusion, Islamic Banking is growing at a rapid pace which will build competition for the existing Banks. To move ahead with Islamic banking the bank management should focus on educating their own employees and customers through organizing seminars and workshops to expose their employees to innovations in Islamic banking products and services, and to equip them well so that they can face the challenges and meet the objectives of making India a financial hub.

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# ORGANIZED APPAREL RETAILING FORECAST IN INDIAN CONTEXT FOR 2011-2016

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**Abstract:** The retail sector in India is witnessing a huge transformation with traditional markets making way for new formats such as departmental stores, hypermarkets, supermarkets and specialty stores. Organized retail in these newer formats has begun appearing in metros and tier II towns, thereby introducing the Indian consumer to a shopping experience like never before. Shifting focus to the Indian Apparel industry, one can notice that it is one of the largest sources of foreign exchange revenue earners for India, plays a vital role in the economic development of the country and is amongst those industries with higher organized retail penetration. The ensuing research study aims to make a forecast of the All India Apparel Sales for organized retail as well as for overall industry. The study has been further extended to Eastern India wherein an effort is made to evaluate the organized retailing potential. The same has been evaluated using both quantitative and qualitative approach. The quantitative approach measures the organized retailing potential in value terms using double exponential smoothing technique as the forecasting tool. Secondary data forms the basis of quantitative study. The qualitative approach makes an assessment of the organized retail potential from the consumer preference towards various retailing formats (conventional as well as organized) and primary research forms the basis of this study. The results of both qualitative and quantitative studies have been compared to arrive at a conclusive result. The study on East India includes four states; namely West Bengal, Bihar, Orissa & Jharkhand and primary research conducted in the state capitals. It covers a sample base of 333 respondents spread across four cities.

## INTRODUCTION

According to North American Industry Classification System (NAICS 44-45) 'the retail trade sector comprises establishments primarily engaged in retailing merchandise, generally without transformation, and rendering services incidental to the sale of merchandise'. Retailing is the final step in the distribution of merchandise wherein retailers sell merchandise in small quantities to the general public. This sector comprises two main types of retailers, that is, store and non-store retailers. Organized/ Modern retailing refers to trading activities undertaken by licensed traders i.e. who are registered for sales tax, income tax etc. and these include the corporate backed department stores, hypermarket and retail chains and also owned large retail businesses. They are also centrally aligned with respect to merchandise, manpower, planning, and touch & feel display arrangement, technology integrations, procurement.

Retailing is the largest industry in India, with an employment of around 8% and is the fifth largest retail destination globally. In India, retailing is one of the significant contributors to the Indian economy and accounts for almost 35 percent of the GDP. This sector is in a fragmented state with over 5 million outlets operating in the country, 96% of whom are very small with an area of less than 50m<sup>2</sup> (Aggarwal, 2000). This is in comparison to 0.9 million outlets in USA, catering to more than 13 times of the total retail market size. The retail universe in India has more than doubled between 1978 and 1996 and the number of outlets per 1000 people has increased from 3.7 in 1978 to 5.6 in 1996, with a major increase in shop density happening in the urban areas from 4 to 7.6 during the same time<sup>1</sup>. In fact India has the highest number of outlets

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<sup>1</sup> Modernization in Indian Retailing : Managerial & Policy Perspectives, Avinash Mulky & Rajendra Nargundkar, Udyog Pragati, vol. 27, no.2, pp. 1-8, April- June 2003

per capita in the world with a widely spread retail network but with lowest per capita retail space<sup>2</sup>.

For Indian retailing, things started to change slowly in the 1990s, when India first began opening its economy and with companies from Textile sector like Bombay Dyeing, Raymond's, S. Kumar's and Grasim emerging with chain of retail outlets. Later on Titan, maker of premium watches successfully created an organized retailing concept in India by establishing a series of elegant showrooms. However, Bata had shown India the concept of retail chain stores with a string of high profile showrooms being managed by them quite successfully much before India opened its economy. For long these remained the only organized retailers, but the latter half of the 1990s saw a fresh wave of entrants in the retailing business. This time around it was not the manufacturer looking for an alternative sales channel. These were pure retailers with no serious plans of getting into manufacturing. During the late 1990's, Indian retailers underwent an experimentation phase when new formats like department stores were introduced by Raheja's (Shoppers' Stop) & Future Group (Pantaloons) along with specialty stores into retailing of Consumer Durables, FMCG, Music, Books and Food were introduced. As the country marched into the new millennium, the organized retailing scenario began to stabilize, especially over the last 3-4 years when players like Big Bazaar, Pizza Hut, and Barista etc became successful in establishing national footprints. This was also the stage when international retailers like Mc Donald's, KFC, Subway etc adopted a mix of global and India specific strategies in order to entice the local population.

The textile and apparel industry plays a vital role in the Indian economy and is one of the largest sources of foreign exchange earnings for India. Currently the industry accounts for 4 percent of GDP, 20 percent of industrial production, and slightly more than 30 percent of export earnings<sup>3</sup>. India is the world's third-largest producer of cotton and has the largest cotton acreage in the world. India also has an established and expanding polyester fiber and filament yarn industry. It is the world's second-largest textile producer after China, accounting for about 15 percent of world production of cotton textiles. India is also the world's largest exporter of cotton yarn with 20 percent of the total, and accounts for about 7 percent of world trade in fabrics<sup>4</sup>. Trade sources estimate that menswear accounts for 25 percent of the readymade apparel market (by quantity); women's wear, 48 percent; and children's wear, 17 percent. Approximately 20 percent of the apparel produced in India consists of branded ready-to-wear garments. While 70 percent of the Indian population living in rural areas, it is worth mentioning that the rural market is growing almost twice as fast as the urban market with increasing prosperity, favourable demographics and the emergence of consumer finance business. Apparel buying has become a year-round phenomenon in urban India; seasonal demand is gradually disappearing from the Indian market. Consumers in India spend approximately 9 percent of their disposable income on clothing and the expenditures in India tend to be relatively higher for households with higher incomes. A recent survey by KSA-Technopak in India reveals that the Indian consumers are typically more loyal to their stores than to brands. About three-fourths of the survey respondents reported that they would revisit the stores where they had previously purchased apparel. The survey also revealed that brand is the second most important factor in purchase decisions. In south India, consumers are generally more brand loyal than consumers from the north. Price, however, is the most important factor for the consumers in East India.

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<sup>2</sup> Retail Report, 2008, India Brand Equity Foundation, Ministry of Commerce & Industry, Govt. of India

<sup>3</sup> South India Textile Research Association (SITRA) Report 2000.

<sup>4</sup> The Cotton Textiles Export Promotion Council Report 2000.

In such a scenario, success of modern retail in any segment critically depends not only on the supply side initiatives but also on the demand side factors. While major investments are happening to improve the supply side factors influencing modern retail (MR), the demand side factors are constantly changing. The demand factors are guided primarily by the consumer mind set and attitude that are deep rooted to the age old habit of buying from conventional retail. The scope or potential of both conventional and organized retailing are proportional to the Consumer preference towards either of these retailing formats. In other words, if consumer preferences towards organized retail formats (i.e. discount stores or super markets or hyper markets or malls) are found to be more compared to the conventional retail formats (i.e. bazaar, stand alone stores, shopping district), then it can be safely assumed that the potential of organized retailing is more than that of conventional retailing and vice-versa. Study of the consumer preference represents the qualitative approach and in such studies it is important to find out the level of association and its strength between the preferred formats in retailing and the location/s. Conclusion can be drawn if an association is found which is strong enough. The same (organized retailing potential) can be estimated using one of the quantitative methods. If both the studies yield similar result, safer interpretation of the quali – quantitative study can be made.

The ensuing study makes a forecast of the All India Apparel Sales, including that of modern retail for the period 2011 – 2016 along with a real time study on the organized retailing potential of Apparel industry in East India using the quali-quantitative approach.

## **REVIEW OF LITERATURE**

Most of the research work conducted on Organized/ Modern Retailing in India falls under the category of Organizational Research. Modern retailing concept being quite new in India, the individual work is quite limited as compared to other areas and subjects. However, the most relevant and important research works, carried out by organizations as well as individuals have been captured for the necessary knowledge and theoretical base on Indian Retailing and to identify the research gap.

*Images KSA Technopak (2005) conducted a study on the scope of organized retailing in India by 2010.* The report shares one of the most important facets of Indian retailing. The size of the organized retailing market stood at Rs. 280 billion in 2004, thereby making a mere 3% of the total retailing market. Moving forward, organized retailing is projected to grow at the rate of 25% - 30% p.a. Further its contribution to total retailing sales is likely to rise to 9% by the end of the decade. On the supply side, mall development activity in the small towns is also picking up at a rapid pace, thereby creating quality space for retailers to fulfill their expansion plans. Thus, the retail boom, 85% of which has so far been concentrated in the metros is beginning to percolate down to smaller cities and towns. The contribution of these tier II cities to total organized retailing sales is expected to grow to 25% - 30%. Though lucrative opportunities exist across product categories, food and grocery, never-the-less, presents the most significant potential in the Indian context. The next level of opportunities in terms of product retail expansion lies in categories such as apparel, jewellery, accessories, consumer durables, catering services and home improvement.

*ERNST & YOUNG, 2006, in its India Retail Report,* highlighted the preferred retailing formats and the industries that will account for organized retailing in India. This is again different from the findings of other researches. E&Y research highlights:

- Hypermarket to be the preferred format for international retailers entering India – Hypermarket provides customers with a combination of good prices, overall shopping convenience

and experience, product range and quality. Currently there are less than 50 hypermarkets in India operated by 4-5 big retailers. The report also says that India's 67 cities with populations of half a million or more have potential to absorb many more hypermarkets in the next 4-5 years.

- Malls to move beyond metros, presence to increase in Tier II cities – There are 220 mall projects in pipeline till 2007, 139 in big 8 cities including metros and 81 in other Tier II cities. The report indicates that till 2006, the focus for developing malls would be around the metro cities with over 60% of them being concentrated in the 6 metros.

- Organized retail penetration highest across footwear, apparel segment – though food & grocery contributes 41% of private consumption expenditure and about 77% of total retail sales, it is largely controlled by the unorganized small outlet sector. Footwear and clothing categories have seen the highest organized retail penetration [ORP]. Footwear has a 22% ORP which is driven by high levels of franchising activity and dominance of home-grown players as well as MNC like Bata. Apparel with 18% ORP is also gearing up for further organized retail presence with high level of branding and merchandising activities spread across formats such as department stores, hypermarkets, franchises and own retail outlets.

*ISCC (Indian Supply Chain Council), 2007, also studied the Opportunities for Apparel Firms in terms of retailing in India due to foreign direct ownership rules.* According to the report, apparel is recognized as the largest organized part of India's retail sector, compared to other areas such as food and jewellery. Foreign multi-brand retailers such as Marks & Spencer currently operate through the franchise route, but since January 2006, foreign retailers selling single brands such as Nike, Mango, and Adidas can own up to 51% of a store or chain in India. Both Wal-Mart stores and Germany's Metro have been lobbying Indian Government to open its retail trade to foreign investment. Indian Government's approval on the major reform of allowing 51% foreign investment in single brand retail operations means that a whole list of top western apparel brand names will be allowed to have majority ownership in their Indian retail chains, however chain stores like Carrefour, Wal-Mart and Tesco do not qualify as single brand retailers.

*Industry experts have also expressed their views on modern retailing growth in India beyond the metros. Some of the important observations and analysis made by individuals include that of Sanjay Gupta, President – Retail, Shri Lakshmi Cotsyn.* According to him Tier II Cities are the future of Indian retailing. It is more viable to run stores in tier II and III cities, as the cost of operation is much lower compared to that in tier I cities. In addition to that, metros and tier I cities are saturated. Also the demand for high-end value-added products is on an increasing trend with very high aspiration level. These smaller towns are loaded with talent, lower labor costs and a considerably lower real estate cost with affordable lease and acquisition costs. The service sector boom is expected to increase the employment opportunity and hence the disposable income level and coupled with changes in the lifestyle, increasing aspiration levels these cities will propel the retailing activities in future.

Research conducted so far reveal huge modern retailing opportunity in India. Reports of most studies conducted so far share the macroscopic view of the opportunity of retailing in years to come in value terms and on expected growth pattern, however apparel sales projections beyond 2010 have not been found. Also such studies have not considered the consumer acceptance/ non-acceptance of modern retail stores which creates the demand. The studies conducted on consumer demand for modern retailing are very limited in number with most of them restricted to geographical territories outside of East India. Also, evaluation of modern retailing potential of East India either in terms of value or from demand aspect (qualitatively) is found to be missing which

creates the platform for conducting a research study that is aimed at evaluating the same for Apparel Industry.

### RESEARCH OBJECTIVES

Two basic research objectives have been framed.

1. The first objective deals with the forecast of Apparel Sales (in value terms) at an All India level as well as in East India for the period 2011 – 2016 for modern retail as well as for overall retail industry using quantitative techniques.
2. The second objective deals with the qualitative assessment of modern retail apparel sales potential wherein the researcher/ investigator has made an attempt to understand the consumer preference towards different formats and also find out the level of association between the different state locations and preferred formats in retailing.

It must be noted that the research methodology adopted for both the qualitative and quantitative studies have been elaborated in the subsequent sections.

The quantitative assessment uses Normative Method. Using this process or method, an attempt is made to forecast the Modern Retail Sales (in value terms) for Apparel Industry. The forecasting method uses Secondary data captured for the period 2004 to 2010 and forecast made for the period 2011 to 2016.

### METHODOLOGY

Exponential Smoothing Technique is used as the forecasting methodology in the present study. Exponential Smoothing is another Averaging technique that inherently assigns weight to the observations. Exponential smoothing methods are recursive, that is, they rely on all observations in the time series. It is a procedure for continually revising a forecast in the light of more recent experience. Exponential Smoothing assigns exponentially decreasing weights as the observation get older. In other words, recent observations are given relatively more weight in forecasting than the older observations.

When the data shows a trend, Double Exponential Smoothing<sup>5</sup> is the most effective method of forecasting which single exponential smoothing method does not anticipate. Single exponential smoothing uses the formula:

$$\hat{Y}_{t+1} = \alpha Y_t + (1-\alpha) \hat{Y}_t \text{ where:}$$

$\hat{Y}_{t+1}$  represents the forecast value for period t + 1

$Y_t$  is the actual value of the current period, t

$\hat{Y}_t$  is the forecast value for the current period, t and

$\alpha$  is the smoothing constant, or alpha,  $0 \leq \alpha \leq 1$

To account for a trend component in the time series, double exponential smoothing incorporates a second smoothing constant, beta ( $\beta$ ). Now, three equations must be used to create a forecast: one to smooth the time series, one to smooth the trend, and one to combine the two equations to arrive at the forecast:

$$C_t = \alpha Y_t + (1-\alpha)(C_{t-1} + T_{t-1}) \dots \dots \dots (i)$$

$$T_t = \beta(C_t - C_{t-1}) + (1 - \beta)T_{t-1} \dots \dots \dots (ii)$$

$$\hat{Y}_{t+1} = C_t + T_t \dots \dots \dots (iii)$$

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<sup>5</sup> Hamdy A. Taha, 1999. "Operations Research – An Introduction", PHI, 6th Edition, Chapter – 13, pp 510

All symbols appearing in the single exponential smoothing equation represent the same in the double exponential smoothing equation, and  $\beta$  is the trend-smoothing constant (whereas  $\alpha$  is the smoothing constant for a stationary – constant – process);  $C_t$  is the smoothed constant process value for period  $t$ ; and  $T_t$  is the smoothed trend value for period  $t$ .

As with single exponential smoothing, one has to select the starting values for  $C_t$  and  $T_t$ , as well as values for  $\alpha$  and  $\beta$ . These processes are judgmental, and constants closer to a value of 1.0 are chosen when less smoothing is desired (and more weight placed on recent values) and constants closer to 0.0 when more smoothing is desired (and less weight placed on recent values). Determination of  $\alpha$  and  $\beta$  values is critical in the correctness of the forecast. Since there are no strict rules about selecting these parameters, one has to experiment with the smoothing constants to find the most accurate forecast at the lowest possible MAD (Mean Absolute Deviation). The absolute deviation is the absolute value of the difference between  $Y_t$  and  $\hat{Y}_t$ .

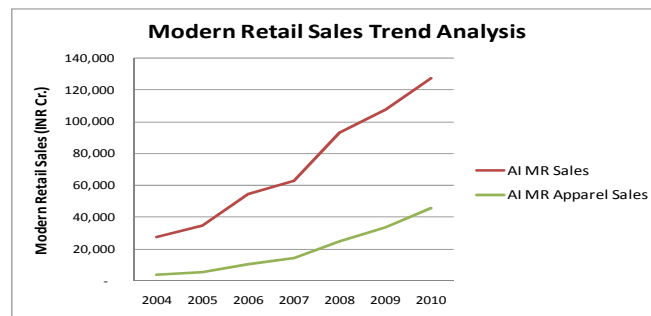
From the secondary data sources, the All India Modern Retail Sales for Apparel and Overall Modern Retail Sales (both in value) were captured and analysed. The sales value analysis shows a trend (as shown below) which is why Double Exponential Smoothing Methodology is chosen as the forecasting tool for the present study that accounts for the trend component in the time series.

Exhibit 1

Year	AI MR Sales	AI MR Apparel Sales
2004	28,000	3,808
2005	35,000	5,530
2006	55,000	10,395
2007	63,000	14,301
2008	93,403	25,032
2009	107,672	33,701
2010	127,425	45,873

*Source: Images; FIICI - E&Y and IRIS Research. Sales Value in INR Crores*

Exhibit 2



## FINDINGS

Using Double Exponential Smoothing Forecast equation, the forecast for All India Modern Retail Sales (AI MR Sales) and All India Modern Retail Apparel Sales (AI MR Apparel Sales) have been calculated for the period 2011 to 2016 (detailed calculation shown in Appendix B). It is to be noted that forecasting was conducted at different values of  $\alpha$  and  $\beta$  ranging between 0.1 and

0.3 and forecast values taken at those values of  $\alpha$  and  $\beta$  where MAD (Mean Absolute Deviation) is minimum. The Sales Forecasts are shown below.

Exhibit 3

<b>Modern Retail Sales Forecast (INR Crore)</b>			
Year	AI MR Sales Forecast	AI MR Apparel Sales	MR Apparel Contribution
	$\alpha = 0.3$ & $\beta = 0.2$	$\alpha = 0.3$ & $\beta = 0.3$	
	137,759	47,002	34.12%
	157,485	56,405	35.82%
	178,396	66,655	37.36%
	200,561	77,827	38.80%
	224,056	90,004	40.17%
	248,960	103,278	41.48%

From the analysis it is clear that organized retailing is fast catching up with conventional retailing though the latter is still ahead in terms of business potential in India. The All India MR Apparel sales contribution to the national figures is expected to touch close to 42% by 2016. The MR Apparel sales contribution to the All India MR sales is found to increase steadily year after year. The CAGR of All India Retail sales is found to be 10.37% where as for All India Modern Retail Apparel Sales, it is 14.02% for the period 2011 - 2016. It is also observed that the All India Apparel sales will more than double by the end of 2016.

For the purpose of estimating the Modern Retailing Potential (in value terms) for East India, it is worth mentioning that the concept of Modern Retailing being quite new in India, till 2009 none of the secondary sources mention state wise/ region wise – sector wise modern retail sales value, although there is enough secondary data on the state wise/ region wise – sector wise overall retail sales value. Thus, considering state wise – sector wise overall retail sales growth pattern in the present context would be inappropriate since it includes both conventional as well as modern retailing data. Iris Research, a renowned research agency engaged in retailing studies, for the first time has captured state wise/ region wise – modern retail sales for different sectors. For e.g. in 2010, Iris Research has captured East India share of Modern Retail Sales to the All India Modern Retail Sales. East Region MR Sales of Apparel is at 9.2% of the All India figures. It must be noted that though East contributes between 15-23% of All India Retail Sales for different sectors (as found out from different secondary sources incl. NSS figs.), the modern retail share is much lesser than the overall retail share. It has been observed that East Modern Retail Contribution by Retail Space to All India is only at 7.15% (Iris Research 2010). Thus, East Region modern retail sales forecast (Value Potential in other words) has been calculated at 2010 base with an assumption that East Region modern retail share would at least remain at 2010 base, if not improve. Hence, East Region Annual Modern Retail Apparel Sales Forecast for the period 2011 – 2016 has been made at a constant contribution rate as mentioned above.

Modern Retail Apparel Sales in East India is expected to growth annually at the rate of 14% to 20% in the next 6 years. The annual growth rate is expected to decrease with time. The above study gives an estimate of the size or potential of modern retailing of Apparel business in value terms. It is worth mentioning that the quantitative analysis like double exponential smoothing technique runs a risk of not considering the consumer taste and preference. However, if the qualitative analysis found out from consumer preference reveals findings similar in nature to that

of the findings of the quantitative study, it can be safely assumed that the quantitative study is devoid of the risk of consumer non acceptance. The qualitative study is presented below.

Exhibit 4

East India Modern Retail Apparel Sales Forecast (INR Crore)					
Year	AI Retail Sales Forecast	AI MR Sales Forecast	AI MR Apparel Sales	East India MR Apparel Sales	East India MR Apparel Sales Growth
	$\alpha = 0.3$ & $\beta = 0.3$	$\alpha = 0.3$ & $\beta = 0.2$	$\alpha = 0.3$ & $\beta = 0.3$		(%)
	1,822,812	137,759	47,002	4,324	
	2,008,522	157,485	56,405	5,189	20.0%
	2,210,946	178,396	66,655	6,132	18.2%
	2,431,588	200,561	77,827	7,160	16.8%
	2,672,088	224,056	90,004	8,280	15.6%
	2,934,233	248,960	103,278	9,502	14.7%

### RETAILING POTENTIAL IN EAST INDIA: A QUALITATIVE ASSESSMENT

**Research Design** - Out of the different types of design, Descriptive research, in the present case, is found to be more appropriate which defines the questions, people surveyed and the method of analysis prior to the beginning of data collection. Basis the Descriptive research design, the sampling technique, questionnaire framing and data collection procedures have been detailed in the subsequent sections.

**Sampling Technique** - Among the various methods of sampling, the investigator prefers to choose the simple random sampling method as it facilitates the need to generalize the results of the population parameter. Primary data was collected with the help of questionnaire, which is an integral part for this research work.

**Questionnaire** - The questionnaire forms the basis of this research. It is a mix of both closed ended and open ended questions. The first part of the questionnaire was designed to obtain information about the personal details. The Second part is designed to capture insights on the preference of consumers on the type of formats for their future retailing needs in the four cities under study.

**Pilot Survey** – Pilot Study was done on a limited number of people from the population before a full scale survey was undertaken. Conducting pilot survey helped to check if the instructions were clear and understandable. Pilot Survey also gave an idea of the time taken to fill up the questionnaire by individuals and the common mistakes that they were making and the likely response rate and reasons for non-response when approached for the survey.

**Data Collection Procedure** - The researcher employed simple random sampling method to collect data from the respondents to ensure that the sample is truly representative of the population and to avoid sampling bias. Owing to time & feasibility constraints, primary research was conducted in the state capitals with the assumption that state capital population characteristics are representative of the state. The study uses a sample size for Kolkata, Bhubaneswar, Patna & Ranchi as 137, 54, 70 & 72 respectively. The process of Data Collection consists of certain stages:

- Telephone directories of Kolkata, Bhubaneswar, Patna & Ranchi have been used as the frame database to source the name and phone numbers of the probable respondents. Ran-



domness in selection process has been maintained. From the random number table we chose the random numbers between 8 & 784 for Kolkata, 6 & 467 for Bhubaneswar, 7 & 500 for Patna and 4 & 311 for Ranchi (page range of telephone directories). Pages with those numbers were selected for drawing the sample. Then the first two names and the last two names from each page were listed along with the respective telephone numbers from all the randomly selected pages. Thus for Kolkata, 200 names, for Bhubaneswar, 100 names, for Patna 120 names and for Ranchi, 120 names with their telephone numbers were listed. In each city, larger numbers of probable respondents (compared to the defined sample size) were listed since not everybody would agree to participate in the survey.

□ All four cities namely Kolkata, Bhubaneswar, Patna & Ranchi, were then divided as East / West / North / South based on the pin codes. Pin code wise – Area wise segregation of each city have been sourced from the postal office city guide book. The objective of this exercise is to check the uniformity in terms of representation from different areas of the city. Effort has been made to ensure that there is representation from each area of the city.

## **Findings**

### *Consumer Preference towards different retailing formats*

The consumer responses were extracted from the relevant portion of the questionnaire. The respondents were asked to indicate their preference towards the formats they prefer to shop from. Respondents had the option of indicating multiple formats i.e. for Apparel purchase, one may opt for conventional retail or he may opt for departmental store along with conventional retail and discount store. The individual preferences of all the respondents were then plotted against the individual formats. From the frequency data, the percentage preference towards individual formats was plotted for all the four state locations. Exhibit 5 and 6 shows the Frequency and Percentage Preference towards different retailing formats for Apparel purchase. The modern retail formats are represented by Malls, Department Stores, Discount Stores, Brand Shops, Stores on High Street and Hypermarkets while conventional retailing system is represented by Conventional Bazar, Stand Alone Stores and Stores in shopping District/ Area. For simplicity the various retail formats have been coded as shown below:

CODE	RETAIL FORMAT	CODE	RETAIL FORMAT
A	Conventional Bazar	F	Department Stores
B	Mall	G	Discount Stores
C	Stand Alone Store/ Restaurant	H	Brand Shop/ Company Showroom
D	Shopping District/ Area	I	Hypermarket
E	Stores on High Street		

For Apparel purchase, it is observed that the Calculated Chi – Square Value > Tabulated Value at 5% level with 24 degrees of freedom. Thus, the Null Hypothesis is rejected and alternative hypothesis accepted i.e. the state locations and the various retailing formats are dependent. In other words, there is an association between the state locations and the different retailing formats. Contingency Co-efficient = 0.339911 which is > 0. Hence the association level is high. Analysis across all four states shows a very positive preference trend towards Modern Retailing formats, upwards of 80 – 85%. In Orissa and West Bengal, maximum preference is towards Discount Stores followed by Malls. In Bihar and Jharkhand, maximum preference is towards Malls followed by Discount Store. For Bihar, brand Shops also occupy the second spot. Brand shops occupy the third spot in Orissa while Stores on high Street occupy the third position in Jharkhand. Some preference is observed in Bihar towards conventional system – Shopping District which is at third preference. In West Bengal, Department stores occupy the third preference position. It

seems from the analysis that a mix of different modern retail formats would be effective since each format is designed to cater different consumer segments.

Exhibit 5

Apparel										
	A	B	C	D	E	F	G	H	I	
Orissa		28	2			15	40	26		111
Bihar		58		25	20	1	40	40		184
Jharkhand		53		11	29		42	28		163
West Bengal		58	3	28	11	47	67	48	2	264
Freq. Total	0	197	5	64	60	63	189	142	2	722
% Preference	0%	27.29%	0.69%	8.86%	8.31%	8.73%	26.18%	19.67%	0.28%	100%

Thus, for purchase of apparel, it is observed that in East India the overall preference is highest towards Malls followed by Discount Stores and Brand Shops. These three formats account for 73.14% of the consumer preference, all three being Modern Retail formats. The preference towards Conventional Retailing is found to be at 17.87% compared to modern retailing preference of 82.13%.

Exhibit 6

Industry	Modern Retail Preference	Conventional Retail Preference
Apparel	82.13%	17.87%

*Evaluation of Consumer Association with different Retailing Formats*

Test of association between different state locations and the preferred formats in retailing where consumers would like to shop from has been found out for apparel purchase so as to have a better assessment of the qualitative study. Chi Square test is performed followed by calculation of Contingency Co-Efficient that gives a measure of the strength of Association. Chi Square Test is performed with the below hypothesis.

H<sub>0</sub>: Null Hypothesis: State Locations and different formats of retailing are independent i.e. there is no association between state locations and retailing formats

H<sub>1</sub>: Alternative Hypothesis: State Locations and different formats of retailing are dependent i.e. there is an association between state locations and retailing formats

Firstly, the observed frequencies are first plotted against the different retailing formats and the row & column totals have been found out (as shown in Appendix A.1.i & A.2.i). Next, the Expected Frequencies (E<sub>i</sub>) have been calculated using the following formula:

$$E_i = \frac{\text{Row Total} \times \text{Column Total}}{\text{Grand Total}}$$

Calculations shown in Appendix A1.ii & A2.ii.

Next, Chi Square is calculated (as shown in Appendix A.1.iii & A.2.iii) using the formula:

$$\text{Chi Square} = \sum \frac{(\text{Observed Freq.} - \text{Expected Freq.})^2}{\text{Expected Freq.}}$$

Finally the Contingency Co-Efficient is calculated using Karl Pearson's formula: -

$$\text{Contingency Co-efficient} = \text{SQ. RT.} [\text{Chi Square} / (\text{Chi Square} + N)]$$

N: Frequency total. Contingency Co-Efficient shows the degree of association and its value ranges between 0 (Zero) and 1. Contingency Co-efficient value closer to 1 signifies stronger association while values closer to zero indicate weaker association. The summary of the association characteristics is shown below in Exhibit 4.

Exhibit 7

Industry	Chi-Square (Calculated)	Chi-Square (Tabulated at 5% level)	Degrees of Freedom	Contingency Co-efficient	Inference
Apparel	94.32	36.42	24	0.339911	Strong Association Exists

## CONCLUSION

Following the limitations of the study.

- ❑ Survey has been restricted to 4 state locations due to time and feasibility issues. Scope to increase locations per state.
- ❑ Survey was made in 4 cities of East India; hence the findings cannot be generalized for other regions or entire country as a whole.
- ❑ Sample size is not the same for all 4 locations. The total sample size is restricted to 333 owing to time constraint. Scope to increase the sample size.
- ❑ Forecast for East Region MR Apparel sales for the period 2011 to 2016 has been made with an assumption that the contribution to All India MR Apparel Sales would at least be of 2010 base level due to lack of data availability; however in reality there could be some fluctuations.

The observations made through the process of the research indicate that the outcome of the quantitative analysis matches well with the qualitative study, which forms the basis of conclusion and recommendation.

- ❑ For Apparel purchase, there is a strong consumer preference towards modern retail in most of the state locations. Conventional Retailing is fast losing its charm to Modern retailing in most of the state locations. The preferred modern retailing formats include malls, discount store & brand shops.
- ❑ Since strong association is observed between the state locations and the different retailing formats, it can be safely assumed that the consumer preferences obtained from the study is likely to match with reality.
- ❑ The Modern Retail Apparel Sales forecast reveal that a healthy growth in MR sales is observed. Its contribution to total apparel sales on a national level is likely to touch close to 42% by 2016. This indicates conventional retailers have to work hard to stay in competition with modern retail.
- ❑ In East India, though growth of MR Apparel Sales is observed year on year; however it is found to follow a decreasing growth pattern which a matter of concern to retailers' already in business and also to investors.

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## Appendix

Consumer Association with different Retailing Formats for Apparel purchase.  
Observed frequencies and the row & column totals.

loc formats	Apparel				
	WB	Orissa	Bihar	Jharkhand	
A	0	0	0	0	0
B	58	28	58	53	197
C	3	2	0	0	5
D	28	0	25	11	64
E	11	0	20	29	60
F	47	15	1	0	63
G	67	40	40	42	189
H	48	26	40	28	142
I	2	0	0	0	2
	264	111	184	163	722

### A.2. Expected frequencies

loc formats	Apparel			
	WB	Orissa	Bihar	Jharkhand
A	0.00	0.00	0.00	0.00
B	72.03	30.29	50.20	44.48
C	1.83	0.77	1.27	1.13
D	23.40	9.84	16.31	14.45
E	21.94	9.22	15.29	13.55
F	23.04	9.69	16.06	14.22
G	69.11	29.06	48.17	42.67
H	51.92	21.83	36.19	32.06
I	0.73	0.31	0.51	0.45

**A.3. Chi Square and Degrees of Freedom (DF)**

CHI SQ. =	2.73	0.17	1.21	1.63		
	0.75	1.97	1.27	1.13		
	0.90	9.84	4.63	0.82		
	24.93	2.92	14.12	14.22		
	0.06	4.12	1.38	0.01		
	0.30	0.80	0.40	0.51		
	2.20	0.31	0.51	0.45		
	31.88	20.13	23.53	18.78		94.32
	<b>DF = (ROW - 1) X (COL - 1)</b> $(9-1) \times (4-1) = 8 \times 3 = 24$					

**B. Modern Retail Sales Forecast**

All India Retail Sales Forecast (INR Crore)								
Year, t	Y <sub>t</sub>	C <sub>t</sub>	T <sub>t</sub>	Ŷ <sub>t</sub>	Ŷ <sub>t+1</sub> = C <sub>t</sub> + T <sub>t</sub>	Deviation	Absolute Deviation	
2004	933,334							
2005	972,222	933,334	38,888	972,222				
2006	1,195,652	1039251	58996.7	1098247.7		97,404	97,404	
2007	1,067,796	1089112	56256	1145368		-77,572	77,572	
2008	1,482,600	1246538	86607	1333145		149,455	149,455	
2009	1,583,417	1408226	109131	1517358		66,059	66,059	
2010	1,699,006	1571852	125480	1697332	1822812	1,674	1,674	
2011	1822812	1734976	136773	1871749	2008522	-48,937	48,937	
2012	2008522	1912781	149082	2061863	2210946	-53,341	53,341	
2013	2210946	2106588	162500	2269088	2431588	-58,142	58,142	
2014	2431588	2317838	177125	2494963	2672088	-63,375	63,375	
2015	2672088	2548100	193066	2741166	2934233	-69,079	69,079	
2004 - 2010 Data Source, Y <sub>t</sub> - Images		C <sub>2</sub> = Y <sub>1</sub> , T <sub>2</sub> = Y <sub>2</sub> - Y <sub>1</sub> . Hence, forecast for t <sub>3</sub> = Y <sub>3</sub> = C <sub>2</sub> + T <sub>2</sub>					685,039	
		<b>MAD Value Calculation at α = 0.3 &amp; β = 0.3</b>					<b>68504</b>	
<b>α</b>	<b>β</b>	<b>MAD</b>		<b>α</b>	<b>β</b>	<b>MAD</b>		
0.1	0.1	116,370		0.1	0.1	11,938		
0.1	0.2	114,083		0.1	0.2	11,287		
0.1	0.3	109,618		0.1	0.3	10,675		
0.2	0.1	92,732		0.2	0.1	8,503		
0.2	0.2	87,149		0.2	0.2	7,690		
0.2	0.3	82,650		0.2	0.3	7,005		
0.3	0.1	73,947		0.3	0.1	6,061		
0.3	0.2	70,230		<b>0.3</b>	<b>0.2</b>	<b>5,419</b>		
<b>0.3</b>	<b>0.3</b>	<b>68,504</b>		0.3	0.3	5,565		

All India Modern Retail Sales Forecast (INR Crore)								
Year, t	$Y_t$	$C_t$	$T_t$	$\hat{Y}_t$	$\hat{Y}_{t+1} = C_t + T_t$	Deviation	Absolute Deviation	
2004	28,000							
2005	35,000	28,000	7,000	35,000				
2006	55,000	41,000	8,200	49,200		5,800	5,800	
2007	63,000	53,340	9,028	62,368		632	632	
2008	93,403	71,679	10,890	82,569		10,834	10,834	
2009	107,672	90,100	12,396	102,496		5,176	5,176	
2010	127,425	109,975	13,892	123,867	137,759	3,558	3,558	
2011	137,759	128,034	14,726	142,760	157,485	(5,001)	5,001	
2012	157,485	147,178	15,609	162,787	178,396	(5,301)	5,301	
2013	178,396	167,469	16,546	184,015	200,561	(5,619)	5,619	
2014	200,561	188,979	17,538	206,517	224,056	(5,956)	5,956	
2015	224,056	211,779	18,591	230,369	248,960	(6,314)	6,314	
2004 - 2010 Data Source ( $Y_t$ ) - Images	$C_2 = Y_1, T_2 = Y_2 - Y_1$ . Hence, forecast for $t_3 = Y_3 = C_2 + T_2$							54,193
	MAD Value Calculation at $\alpha = 0.3$ & $\beta = 0.2$							<b>5419</b>

All India Modern Retail Apparel Sales Forecast (INR Crore)								
Year, t	$Y_t$	$C_t$	$T_t$	$\hat{Y}_t$	$\hat{Y}_{t+1} = C_t + T_t$	Deviation	Absolute Deviation	
2004	3,808							
2005	5,530	3,808	1,722	5,530				
2006	10,395	6,990	2,160	9,149		1,246	1,246	
2007	14,301	10,695	2,623	13,318		983	983	
2008	25,032	16,832	3,678	20,510		4,522	4,522	
2009	33,701	24,468	4,865	29,332		4,369	4,369	
2010	45,873	34,295	6,354	40,648	47,002	5,225	5,225	
2011	47,002	42,554	6,925	49,480	56,405	(2,478)	2,478	
2012	56,405	51,557	7,549	59,106	66,655	(2,701)	2,701	
2013	66,655	61,371	8,228	69,599	77,827	(2,944)	2,944	
2014	77,827	72,067	8,969	81,036	90,004	(3,209)	3,209	
2015	90,004	83,726	9,776	93,502	103,278	(3,498)	3,498	
2004 - 2010 Data Source, $Y_t$ - FICCI and Ernst & Young, IRIS Research	$C_2 = Y_1, T_2 = Y_2 - Y_1$ . Hence, forecast for $t_3 = Y_3 = C_2 + T_2$							31,173
	MAD Value Calculation at $\alpha = 0.3$ & $\beta = 0.3$							<b>3,117</b>

$\alpha$	$\beta$	MAD
0.1	0.1	5,780
0.1	0.2	5,556
0.1	0.3	5,345
0.2	0.1	4,408
0.2	0.2	4,318
0.2	0.3	3,919
0.3	0.1	3,380
0.3	0.2	3,197
<b>0.3</b>	<b>0.3</b>	<b>3,177</b>

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