

## **CUSTOMER & CORE TECHNOLOGY SUPPLIERS: SOME UPSTREAM SUPPLY CHAIN EVIDENCES FROM CONSUMER ELECTRONICS & DURABLE INDUSTRY IN OMAN**

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### **ABSTRACTS**

*The paper intends to find the specific factors about the supplier/manufacturer's that are of concern to the customer in the wider supply chain network. It will also study how these factors affect the sales of CED products. This paper portrays the beliefs of customer about the upstream supplier/ manufacturer and its influence on the sale of white goods and consumer electronics in Oman by using a questionnaire containing questions about the supplier/ manufacturer. Discriminant analysis has been used for predicting a function that throws light on the likely sales. The model was successful in finding a discriminating function that throws light on the effect of supplier/ manufacturer's profile on the sales of CED products in Oman region. It was able to predict the effect of the specific factors about the supplier/manufacturer's on the prospective sales of CED products. The sample survey had been administered to 120 customers chosen randomly, 60 from Hyper Markets and 60 from specialized stores in Oman dealing with CED products. Many researchers have dealt with the supply chain problems pertaining to transportation and inventory for the upstream activities. Procurement problems are also taken up but from the perspective of manufacturer. This paper is an attempt to deal with procurement issues from the perspective of the customer.*

**Keywords:** *Consumer Electronics Store, Sales, Discriminant Analysis, Upstream Supply Chain*

### **1. INTRODUCTION**

Effective supply chain management can serve as an important tool for achieving competitive advantage. The businesses try to influence customer's decision at each stage of the buying process. A buying decision depends upon the amount of money spent and the utility of the product. Consumer Electronics & Durable industry (CED) is one such industry where the amount of money spent is high and the utility of the product is also high e.g. buying an air conditioner requires a good amount of money to be spent and customer would not like it to be out of service even for a little bit of time. Another vignette of this industry is its high clockspeed. New products are introduced in a short span of time, which makes the buying even more complex. Buying process is also influenced by attitudes, values and beliefs. Customers can be segmented by location, demographics, disposable incomes and lifestyles etc. Buying decisions are influenced by innovative products too. Core technology suppliers come into picture here. Consumerization of technology has triggered a new battle among companies to gain more and more of market share.

The Consumer Electronics & Durable industry (CED) in Oman can be segregated into consumer electronics and consumer appliances. Heavy cost of selling and logistics in Oman is one of the challenges for the players. Dependency on other countries for finished goods is as high as 95%. This results in the high cost of logistics and inventories. Most of the companies work on three tier distribution system to avoid the logistics cost and its implications. The upstream supply chain activities thus become very significant for the region. This part is mainly concerned with procurement of raw materials. It includes suppliers that could be manufacturers themselves. Most of these suppliers have their own supply chains. These "upstream" suppliers/manufacturers "design" products that could be sold to "downstream" customers. Major activities in this part of the supply chain are procurement and shipping. Procurement gives a mechanism for coordinating the flow of materials between

customers and suppliers. Major differentiators in this part of the supply chain as far as procurement is concerned could be manufacturer's procurement profile, manufacturer's country of origin, manufacturer's economic condition and the amount of money the manufacturer spends on research for improving the product. If upstream activities are meant for the downstream customer then customer is ought to be concerned about the upstream activities. This study aims at studying customer's perception on the aforesaid differentiators.

## 2. LITERATURE REVIEW

Charles Fine (1998) in his book *Clockspeed* writes, "The farther you look upstream in your technology supply chain, the more volatility you see. Customers are foolish if they don't spend any time or resources thinking about the health, survival, and possible independence of their core technology suppliers". So in order to stay competitive in the market place industries choose different ways. These different ways are the result of industry's clockspeed. Fine (1998) explained the concept of "clockspeed". According to him, "industries with high clockspeed will require different products and services, processes and value chain designs when compared to industries with low clockspeed".

One-size-fits-all solutions do not work in supply chain management. They depend on the current industry settings. Consumer electronics and durables industry is one such industry with high clockspeed. Bert et al (2007) commented, "With increasing clockspeed, the use of inventory as a means of providing slack against uncertainty decreases, whereas the use of lateral relations increases. Consumer electronics and durable products have shorter life cycles of the products so there is always a need of inventing new innovative products and also the need to organize them well.

As per Burt & Dobbler (2003), "Firms that embrace World Class Supply Management work with their suppliers to design quality into the supplier's products and maintain quality during production. The result is virtually defect-free incoming materials, improved quality in the marketplace, more sales, and improved profit margins". Woodside and Ozcan (2009) put forward that some manufacturers can justify higher prices for their products just because of the consumer's quality assumption that accompanies the brand name. According to Collins and Burt (2003), "Retail brands represent retailers' specific investments in their relationship with their customers but also represent manufacturers' specific investments in their relationship with the retailers". Oubina et al (2006) resented an analysis framework to study the impact of the production of retail brands on the manufacturer's relationship with the retailer, depending on the manufacturer's competitive position in the brands they produce. Lao et al (2011) studied the success factors in supply chain networks from the manufacturer's perspective and found that even the choice of 3pl service provider depends on factors like customer satisfaction and customer loyalty.

It can be inferred that customer is in the most important position and most of the activities are done in order to maximize customer satisfaction vis-à-vis profitability. Moreau et al (2001) commented that "manufacturers and retailers hold similar, but equally inaccurate views of consumers' industry knowledge". This study was however restricted to the beliefs about different types of promotions only. Burt et al. (2003) postulated that businesses capitalize on suppliers' exceeding research and know-how. Businesses use the R&D products of other firms as their inputs. This is done in order to attract the customer towards an innovative product and give him maximum satisfaction. Further, in many countries there are stringent laws on product liability. Takahashi (1996) commented, "In contemporary society, consumers use in daily lives manufactured products that are mass-produced and mass marketed, which means their personal safety depends heavily on the manufacturers who design and produce such products". Many researchers have dealt with the supply chain problems pertaining to transportation and inventory for the upstream activities (e.g. Bhatnagar & Teo (2009), Berman & Wang (2006) etc.). Graves & Willems (2005) raised the question of determining what suppliers, parts, processes and transportation modes to choose at which stage in the supply chain in order to optimize it. This study is thus an attempt to study and model customer's view on upstream supply chain activities related to procurement at the manufacturer's end. Although customer is not directly related to these activities but these activities are important for the product that will be finally received.

## 3. RESEARCH QUESTION

The intention of this research is to find a discriminating function that throws light on the effect of supplier/manufacturer's profile on the sales of the product. We focus on the aforesaid procurement aspects of CED products in Oman region. As such, our research question is:

*RQ-* What specific factors about the supplier/ manufacturer are that are of concern to the customer and in the wider supply chain or network, and how do these factors affects the sales of CED products to customers?

Given the state of existing research, this study takes an exploratory approach and maintains a data-oriented view of these upstream factors.

#### 4. RESEARCH METHODOLOGY

Primary data has been collected from the customers of electronic retail stores on parameter that acts as a trigger for making a purchase. Questions pertaining to upstream Supply Chain of consumer electronics and durables (CED) products were asked from the customers. The information was collected on manufacturer's procurement profile, manufacturer's country of origin, manufacturer's economic condition and amount of money the manufacturer spends on research.

#### 5. RESEARCH DESIGN

We study the ranks given to these factors by the customers as a trigger for purchasing the product. This has been seldom attempted. We have tried to find a discriminating function that will forecast the sales trigger by taking the materialized sales as the grouping variable. The grouping variable thus is a binary variable having value "1" if the customer actually purchased and value "2", otherwise. This will help the store in stocking those items that have sound supplier/ manufacturer background attached to them. This will also help the customer in making the choice between the items.

#### 6. DATA COLLECTION AND ANALYSIS

The Major Hyper markets such as Carrefour, LULU, Safeer have been chosen for this survey where the footfall is for the consumers who primarily come for grocery or other necessity and buy electronics randomly. These stores are all product stores from grocery & garments to electronics. The second kinds of stores that we covered for the survey were exclusive electronic stores or Power retailers Like: Radio Shack, E Max & GENETCO electronic showrooms. These are multi-brand electronic showrooms. The sample survey had been administered to 120 customers chosen randomly, 60 from set one of Hyper Markets and 60 from specialized stores. The information was collected on manufacturer's procurement profile, manufacturer's country of origin, manufacturer's economic condition and amount of money the manufacturer spends on research. As the grouping variable, the materialized sale is taken. The data so collected was analyzed using the Discriminant analysis. Discriminant analysis builds a predictive model for group membership. The model is composed of a discriminant function based on linear combinations of the predictor variables that provide the best discrimination between the groups. The functions are generated from a sample of cases for which group membership (in this case the materialized sales) is known; the functions can then be applied to new cases that have measurements for the predictor variables but have unknown group membership.

#### 7. RESEARCH FINDINGS

Following information was used to do the analysis:

- X1= Rank given to manufacturer's procurement profile,
- X2= Rank given to manufacturer's country of origin,
- X3= Rank given to manufacturer's economic condition
- X4= Rank given to amount of money the manufacturer spends on research

Attempt was made to find out how well these four variables correctly classify those customers who actually purchased (the variable *Purchase Decision, PD*). The classification results are shown in the following table:

**Classification Results<sup>a</sup>**

PD			Predicted Group Membership		Total
			1	2	
Original	Count	1	16	6	22
		2	47	54	101
	%	1	72.7	27.3	100.0
		2	46.5	53.5	100.0

a. 63.1% of original grouped cases correctly classified.

This indicates that 70 of the 123 cases have been correctly classified using these four variables. The standardized discriminant function coefficients are shown below. These results show that X4 (Rank given to amount of money the manufacturer spends on research) has the greatest discriminating power.

**Standardized Canonical Discriminant Function Coefficients**

	Function
X1	.061
X2	.262
X3	.117
X4	.960

**Wilks' Lambda**

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
	.952	5.913	4	.206

Wilks' Lambda indicates that the equation given below is statistically significant at  $\alpha=0.206$ .

$$PD = -0.061 X1 - 0.262 X2 + 0.117 X3 + 0.960 X4$$

Using this discriminant equation, one can now predict whether the customer is a prospective buyer or not.

**8. FINDINGS**

The independent variables taken for this study are not much correlated. The highest correlation was 0.357 between X1 and X4. The results of classification were not as encouraging as they were expected to be. The model was able to classify 63.1% cases successfully. Also as per the Wilks' Lambda, discriminant equation was found to be statistically significant at  $\alpha=0.206$  (80% confidence). However the model was able to identify independent variable X4 (Rank given to amount of money the manufacturer spends on research), which has the greatest discriminating power.

**9. CONCLUSIONS**

The model was found on the basis of data collected from the major hyper markets and exclusive electronic stores or power retailers. Thus it is a heterogeneous sample. Keeping this in mind, the performance of the model could be deemed satisfactory. The intention of this research was to find a discriminating function that throws light on the effect of supplier/ manufacturer's profile on the sales of CED products in Oman region. The model was successful to attain this objective. It was successful in predicting the effect of the specific factors about the supplier/ manufacturer's on the prospective sales of CED products. Thus it was partially successful in giving the answer to the research question.

**10. MANAGERIAL RELEVANCE**

This study should make it clear why it is useful to take a look at the upstream supply chain decisions related to procurement. The statement of Charles Fine (1998), "The farther you look upstream in your technology supply chain, the more volatility you see. Customers are foolish...." proves its relevance here. The model portrays that customers do look onto these upstream factors while making a purchase. More distinctively, the proposed model may offer a strategy for managers for developing appropriate upstream supply chain decisions related to procurement.

**11. LIMITATIONS AND SUGGESTIONS FOR FURTHER WORK**

The sample survey had been administered to 120 customers chosen randomly, 60 from set one of Hyper Markets and 60 from specialized stores in Oman. The dataset could be more exhaustive. However the aim was not to analyze the customer buying behavior in consumer electronics & durable industry (CED) in Oman, the aim was to see the effect of these upstream supply chain elements on the buying decisions. Further work can be done on applying this model to larger datasets from varied regions.

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