An Empirical study on finding factors relevant for an effective merchandise management and the technology intervention in Semi-organized Consumer Durable retail stores in India

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ABSTRACT
The use of technology by Semi-organized consumer durable retailers has been profound and transformative, affecting various aspects of their operations. These retailers are typically small, independent businesses that are in phase of transforming themselves to organized retailers. The integration of technology is bringing some benefits along with certain challenges. Technology has the potential to greatly benefit Semi-organized consumer durable retailers by improving their operations, increasing their market reach, and enhancing the customer experience. Retailers need to be adaptive to the changes in order to address the discerning consumer needs. They have started focusing on distinctive service levels like adequate availability, variety, speed and convenience as vital way of attracting and retaining customers.
Managerial implications are drawn from specific findings related to the role of determinants of effective merchandise management i.e. Retailer size, supplier relation, competition and mediating role of technology on effective merchandise management. Recommendations are made keeping in mind the nascent level of technology application and other constraints of Semi-organized retailers. The Semi-organized retailers may be called as moderate technology adopters. They do have an understanding of benefits of technology application in their operations but it is clearly evident that technology usage remains in a nascent stage. Realizing and using full potential of technology may prove to be a game changer for Semi-organized Retailers.

Keywords: Merchandise Management, Technology application, Semi-organized retailers, Consumer Durables, Mediation analysis

Introduction
One of the largest sectors in the world is the retail sector, as every single business opportunity requires retailing for their goods or services. The retail industry in India is estimated to be over INR 40 Lakh Crores and accounts to 10% of India's GDP. According to estimates, the unorganized retail sector constitutes over 90% of the country's retail industry. Retail sales in September 2024 showed a growth

of 5% as compared to the sales levels in September 2023, according to the survey by Retailers Association of India (RAI).

Traditionally, the Indian retail industry has been dominated by unorganized local players, with consumers shopping at mom-and-pop operations, roadside markets, and small stores for their daily needs. Only the last few years have seen a rise in modern retail formats where the unorganized are trying to move towards organized retail and in this transition comes the Semi-organized retailers (Chaturvedi, 2010).

In order to meet up with the requirements retailers must continually handle a variety of tasks, including merchandise management, logistics, warehousing etc. for cost reduction and optimization. Retail industry has a large inventory due to its many SKUs, so managing merchandise inventory management becomes a major concern for them (Gudka, et.al, 2022). Large retailers have acknowledged the importance of technology to attain operational efficiency. The success of the retailers is majorly dependent on their ability and willingness to harness and adopt new technology (Powel and Dent-Micallef, 1997).

Literature Review

Today retailers are facing many challenges in planning and managing their resources and for this retailers require efficient management of human, technological or material resources which the companies could gain over time (Mou et al., 2018). All this makes management of inventory essential for retailers. The aim of managing inventory is to ensure that stocks of raw material, work-in progress and finished goods, are kept at optimum levels that provide maximum service levels at minimum costs (MacAs et al., 2021). In past few years it has become one of the critical factors for retailers (Sridhar et al., 2021). Not only holding inventory but ensuring product variety and optimal inventory level is always regarded as an operational challenge for retailer (Sridhar et al., 2021). Along with maintaining quality as per requirement, inventory management has also become extremely challenging due to the changing behavior of customers, competition, rapid technological changes and globalization (Gupta et al., 2020).

Merchandise is both an asset and a liability for a retailer (Ayad, 2008). Extra merchandise occupies physical space, blocks capital and increases the possibility of spoilage and damage. Insufficient merchandise inventory increases the likelihood of dissatisfied customer, as customers may get irate and switch to other stores if desired merchandise is not available immediately (Koumanakos, 2008). Effective merchandise control helps retailers in ensuring that consumer needs are fulfilled, the investments on merchandise are minimized, profits are increased and various costs involved in managing and selling merchandise is reduced. It also provides information about items that are slow selling and should be marked down, transferred or returned to vendors (Bohlinger, 1993).

Intensely competitive environment and survival challenges have influenced the organized retailers to adapt to the changing scenario, whereas, unorganized retailers emulate the tested operations of established and successful organized retailers to withstand in the intensely competitive market. In this stage of transition when unorganized retailers graduate towards adopting more organized approaches a new retail type emerges as the semi-organized retail (Somashekhar, Raju and Patel, 2013). The semi-organized retailers are characterized by those retailers who are stand alone stores located in traditional market places; using systematic methods of billing while utilizing certain dimensions of technology in the front end operations. They still use traditional ways of forecasting merchandise and managing customer service. Semi-organized retailers have an advantage of long term relationships with existing customers, which they can leverage by using modern business processes to change their operations.

Traditional retailers must immediately embrace and adapt technology to survive in the competitive retail industry. Technology adaptation includes using PoS system software with a printer and barcode scanner to substitute modern retail cash registers, a combination of mobile apps and PoS system software to imitate PoS, and adapted EDC for digital product transactions. Available technology should be adapted to ensure low complexity, compatibility, and reliance on technologies that are familiar to people in developing countries (Isharyani, et.al 2024).

Technology application enhances interaction among business partners and provides speed in purchasing process (Maltoni, 2014). Application of technology focuses on improving the efficiency of retailers by making them familiar with technology tools and helping them to take definite steps towards leveraging technology for process improvement (Krishna, 2001). Technology competence comprises of hardware, software, availability of infrastructure for technology deployment and the experts (Anand and kulshreshtha, 2007).

In order to use technology, retailers need to have proper infrastructure which support the technology application (Dash and Chandy, 2013). For technology application retailers need sufficient commitment of time, effort of their employees to learn about technology and high capital investment. Lack of sufficient resources to deploy technology, management commitment and resistance of suppliers towards use of technology (Cznikota and Kotabe, 1992) is a major challenge. This is coupled with the challenge of retaining specialized talent to manage the technology. Training of employees for using technology involves time and effort and despite of proper training, employees are still reluctant to use technology which makes retailer rethink about technology application (Kurnia et al., 2013). So for all these challenges new technologies like Internet of Things (IoT), automated inventory control platforms, and automatic storage and retrieval systems can offer effective solutions to these issues (Maheshwari et al., 2021).

Determinants of Effective Merchandise Management and influence of Technology
In order to succeed in constantly changing environment, retailers need to align their strategy and operations with market dynamics. To remain responsive and offer adequate service level, retailers require twin approach of strategy formulation through high degree of integration with the vendors and manufacturing partners to understand what activities underpin delivery of merchandise, and whether certain activities can be handled concurrently to speed up the process and provide flexibility in terms of end product (PWC, 2012). Merchandising is affected by factors like organization structure, size of the retail store, merchandise carried and the type of store (Pradhan, 2004). Identifying determinants of effective merchandise management along with the influence of technology on each determinant can help retailers in increasing their profit and reducing the cost involved in it. As technology along with the effective merchandise management may create synergies to build strong position for retailers. Different determinants identified from literature review are **Competition** (Daughtery, Kauslis and Richey, 2002), **Service Level, Availability** (Mpwanya, 2005), **Merchandise variety** (Randall, 2001), **Merchandise Turnover, Demand** (Kokemuller, 2013), **Retailer size** (Gaur and Kesavan, 2007),

Supplier Relation (Duffy and Fearne, 2004).
Retailers benefit from technology application to achieve effective merchandise management. The benefits include resource optimization, cost reduction, improved sales & profitability and easy storage & retrieval of stock. Retailers need to be agile and flexible in adopting technology in retail operations (Ann, Victoria and Ukpere, 2014) to reap all these benefits. Merchandise management is developed to meet the rising challenges in retail organizations and it ensures that all the activities involved in stock keeping and stock management are properly managed (Godana and Ngugi, 2014). Consequences of

effective merchandise inventory can be measured in terms of cost, customer service, service metric (Frazelle, 2002) along with reduction in lead time, improved service level quality (Gourdin, 2001) and increased profit.

Objectives: following are the objectives of the research conducted
1. To identify the Determinants of Effective Merchandise Management for Semi- organized Consumer durable retailers.
2. To study the relevant Consequents of Effective Merchandise Management for Semi- organized Consumer durable retailers.
3. To identify the role of technology application in Effective Merchandise Management in Semi-organized retailers of Consumer Durables.

 Methodology:
Research methodology is defined as the strategy or the process of choosing different methods and tools to derive desired outcomes. The approach for this investigation is exploratory and encompasses quantitative research tools. The primary sampling unit for the survey is Semi-organized consumer durable retailers. For the purpose of the study these retailers were defined as stand-alone stores, located in old market places. The data was collected with the help of convenience sampling method from consumer durable retailers.

Hypotheses for Study

H_{0-1}	**Determinants of Merchandise Management for semi-organized Consumer Durable products do not have a significant influence on Effective Merchandise Management**
H_1	**Determinants of Merchandise Management for semi-organized Consumer Durable products do have a significant influence on Effective Merchandise Management**
H_{1a}	Retailer size has a significant influence on Effective Merchandise
H_{1b}	Supplier relation has a significant influence on Effective Merchandise
H_{1c}	Competition has a significant influence on Effective Merchandise
H_{1d}	Service level has a significant influence on Effective Merchandise
H_{0-2}	**Technology does not have a mediating influence on the relationship between Determinants and Consequents of Effective Merchandise Management of semi- organized Consumer durable products.**
H_2	**Technology does have a mediating influence on the relationship between Determinants and Consequents of Effective Merchandise Management of Consumer durable products.**
H_{2a}	Technology has a positive influence on the relationship between Retailer Size and Consequents of Effective Merchandise Management
H_{2b}	Technology has a positive influence on the relationship between Supplier Relation and Consequents of Effective Merchandise Management
H_{2c}	Technology has a positive influence on the relationship between Competition and Consequents of Effective Merchandise Management
H_{2d}	Technology has a positive influence on the relationship between Service level and Consequents of Effective Merchandise Management

Analysis

In order to reduce the data into minimum number of factors which account for the maximum portion of total variance represented in the original data, Principal Component Analysis (PCA) is used to obtain results (Hair et al., 2009). Separate principal component analysis for Independent variable, Dependent variable and Mediating variables is done as they are measuring different parameters. Four factors are considered under Independent variables that are Retailer size, Supplier relation, Competition and Service level. Consequent of effective merchandise management is considered as Dependent variable. Technology is considered as mediating variable because it plays a vital role in enhancing effectiveness of merchandise inventory. Right technology application for managing merchandise allows for optimum utilization of space and capital. Effective management of merchandise is important for retailers to improve their service levels, by timely and adequate availability of merchandise in an efficient manner.

Principal Component Analysis and Reliability Analysis for Determinants of Merchandise Management – Independent Variables

Factor Name	Items	Variance Explained	Eigen Values	Rotated Factor Loading	Cronbach's Alpha
Factor 1 Retailer Size	Store_size	15.619	2.986	0.844	0.815
	Back_size			0.813	
	Ware_size			0.779	
	Obsolesce			0.672	
Factor 2 Supplier Relation	New_prod	13.873	2.53	0.761	0.6875
	Inf_exch			0.722	
	Supl_Sup			0.680	
	Merc_turn			0.620	
Factor3 Competition	Chang_se	10.796	1.911	0.743	0.5852
	Comp_crm			0.717	
	Competit_env			0.606	
Factor 4 Service Level	Pro_var	10.558	1.616	0.736	0.5538
	Pro_Ava			0.630	
	Demand_Unvr			0.578	
	Sku			0.527	
Factor 5	Num_unit	9.792	1.261	0.651	0.359
	Comp_st			0.648	

Principal Component Analysis and Reliability Analysis for Consequents of Effective Merchandise Management – Dependent Variable

Factor Name	Items	Variance Explained	Eigen Values	Factor Loading	Cronbach's Alpha
Consequents of Effective Merchandise Management	Red_cost (Reduced Cost)	53	2.148	0.750	0.649
	Inc_Pro (Increased Profit)			0.647	
	Red_time (Reduced Time			0.637	
	Enh_Cs (Cutomer satisfaction)			0.620	
	Red_mer (Reduced Merchandise)			0.614	

Principal Component Analysis and Reliability Analysis for Technology Application– Mediator Variables

Factor Name	Items	Variance Explained	Eigen Values	Factor Loading	Cronbach's Alpha
Technology Application	Tech_dec (Technology helps in taking better decision)	40.40	2.020	0.749	0.6284
	Timp_mer (Technology improves merchandise accuracy)			0.708	
	Adp_cost (Technology adoption increases cost)			0.672	
	Tech_c_i (Technology improves company image)			0.546	
	Tmer_cost (Technology lowers merchandise cost)			0.514	

Regression Analysis - Mediation

In order to test for mediation effect of Technology application between Determinants and Consequents of Effective Merchandise Management, Regression Analysis using Baron and Kenny approach was conducted. They proposed a four step approach in which several regression analyses are conducted and significance of the coefficients is examined at each step. A regression model is run to test the relationship among the Independent Variables (Retailer Size, Supplier Relation, Competition and Service level) and the Dependent Variable i.e. Consequents of Effective Merchandise Management with Technology application as mediator.

Regression analysis with X (Determinants of Effective merchandise) and Z (Technology application) predicting Y (Consequents) to test if Z completely mediates Y, $Y = a + b_1 x + b_2 z + e$. Pearson Correlation Matrix for Independent, Dependent and Mediator Variables

	CONS2	RET_SIZ2	SUP_REL2	COMP2	SER_LEV2	MED2
CONS2	1.000					
RET_SIZ2	.391	1.000				
SUP_REL2	.284	.058	1.000			
COMP2	.135	.211	.200	1.000		
SER_LEV2	-.053	.015	.223	.109	1.000	
MED2	.411	.456	.341	.059	.141	1.000

The Hierarchical Regression analysis as reported in Table 6.10b shows that the Independent Variables explain a variance of 25.2 percent (Adjusted $R^2 = 0.252$, $p < 0.05$) in the data. The entry of the mediator term, i.e. Technology Application, causes a significant incremental variance ($\Delta R^2 = 0.038$, $p < 0.05$). The significance of β coefficient of the mediator ($\beta = 0.304$, $p < 0.05$) indicates that Technology Application acts as a Mediator between the Determinants and Consequents of effective merchandise management

Summary of Mediator Regression Results: Effect of Technology application on consequents of Effective Merchandise Management

	Model 1 (β values)	Model 2 (β values)
Independent Variables (IV)		
Retailer size	.404**	.269**
Supplier Relation	.343**	.232**
Competition	.239**	.173**
Service level	-.089	-.082
Mediating Variable		
Technology		.304**
R^2	.260	.298
Adjusted R^2	.252	.258
ΔR^2	.260	.038
Std error of estimate	0.31814	0.30732
Sig. F Change	.001	.000
Durbin - Watson	1.123	

Validation of Mediation Regression analysis for Hypotheses H$_{2a}$, H$_{2b}$ and H$_{2c}$
The analysis for testing the hypotheses by adopting Baron and Kenny's 1986 model approach, can be validated by substituting standardized beta coefficient a, b, c' values as shown in figure 6.7. The overall strength of the association for the entire path (Total Effect) is estimated by multiplying the coefficient for each part of the path. The strength of the mediated effect is given by the product of the standardized estimates of the path coefficient, ab. The strength of direct or non-mediated path corresponds to c'.

Total effect= Direct effect + Indirect effect
C= c'+ (a*b)
Part A: - Direct effect

c=0.404

T X ffe... ... ...* Y]+0.269

Part B. - Indirect and Mediated effect   c=0.404
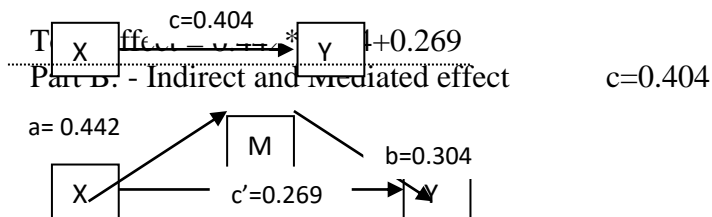
a= 0.442
M
b=0.304
X   c'=0.269

Figure 6.7.1 Validation of Hypothesis H$_{2a}$

Thus using mediated regression approach, the result indicates significant indirect effect between Retailer size and Technology application (coefficient a), Technology application and Consequents of effective merchandise (coefficient b) and partial mediation between Retailer size and Consequents of effective merchandise (coefficient c').
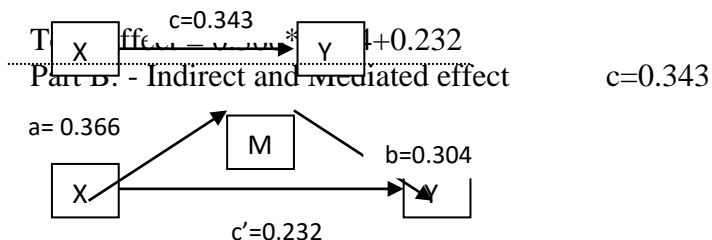
Part A: - Direct effect

c=0.343

T X ffe... ... ...* Y]+0.232

Part B. - Indirect and Mediated effect   c=0.343

a= 0.366
M
b=0.304
X
c'=0.232

Figure 6.7.2 Validation of Hypothesis H$_{2b}$

Thus using mediated regression approach, the result indicates significant indirect effect between Supplier Relation and Technology application (coefficient a), Technology application and Consequents of effective merchandise (coefficient b) and partial mediation between Supplier Relation and Consequents of effective merchandise (coefficient c').
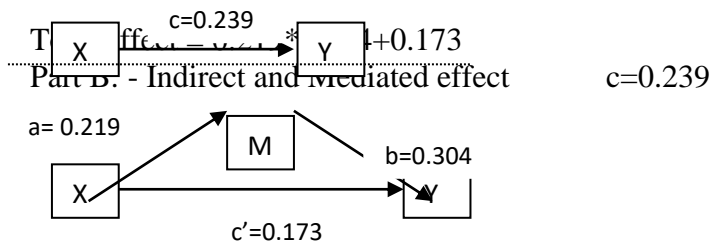
Part A: - Direct effect

c=0.239

T X ffe... ... ...* Y]+0.173

Part B. - Indirect and Mediated effect   c=0.239

a= 0.219
M
b=0.304
X
c'=0.173

Figure 6.7.3 Validation of Hypothesis H$_{2c}$

Thus using mediated regression approach, the result indicates significant indirect effect between Competition and Technology application (coefficient a), Technology application and Consequents of effective merchandise (coefficient b) and partial mediation between Competition and Consequents of effective merchandise (coefficient c').

Total Effect Table

H. No	Hypothesis	Indirect effect (a & b)	Direct effect (c')	Total effect (c)	Sig.	Magnitude of Mediation

H. No	Hypothesis	Indirect effect (a & b)	Direct effect (c')	Total effect (c)	Sig.	Magnitude of Mediation
H$_{2a}$	Technology has a positive influence on the relationship between Retailer Size and consequents of Effective Merchandise Management	a= 0.442 b= 0.304	C'= 0.269	C= 0.404	.000	Partial
H$_{2b}$	Technology has a positive influence on the relationship between Supplier Relation and consequents of Effective Merchandise Management	a= 0.366 b= 0.304	C'= 0.232	C= 0.343	.031	Partial
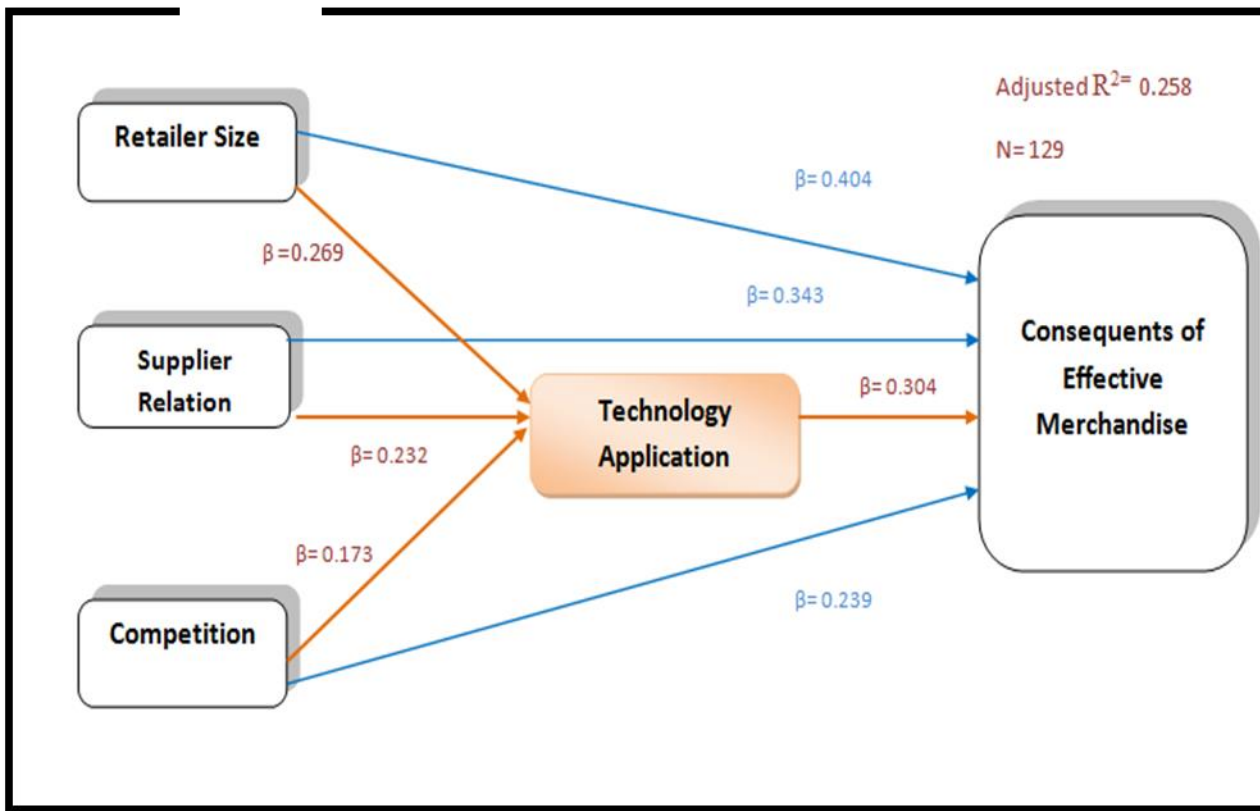
Influence of Technology application on the relationship between Determinants and Consequents of Effective Merchandise Management

Discussion

The analysis suggests that Determinants of effective merchandise management i.e. Retailer size (β=0.404), Supplier relation (β=0.343) and Competition (β=0.239) significantly influence consequents of effective merchandise management which leads to acceptance of hypotheses H$_1$. The study further showed that effective merchandise management is mediated technology application. In order to

accomplish their task, retailers may consider the technology application aspect.

Technology application exhibited dissimilar mediating effects leading to a partial acceptance of proposed hypothesis H_2. This is due to the fact that technology deployment in the area of merchandise management alone cannot help the retailers in all aspect of increasing revenue, reducing cost and improving customer satisfaction. Managing the competition, supplier relation and retailer size mediated by technology may influence effective merchandise management in the same effect. The analysis shows that technology application value acts as a mediator and influences the impact of Retailers size ($\beta=0.269$) Supplier Relation ($\beta=0.232$) and Competition ($\beta =0.173$) on determinants of effective merchandise management which leads to acceptance of hypotheses H_2. The finding could be attributed to the fact that, in order to sustain in intensely competitive environment Semi-organized retailers are though striving to maintain their variety and availability, yet due to several constraints like finance and space. Retailers may not voluntarily choose higher service level.

Managerial Implication

The managerial implications are drawn from specific findings related to the role of determinants of effective merchandise management Retailers'Size, Supplier Relations and Competition on effective merchandise management and the partial mediating role of technology. Thereby it is prudent for a semi organized retailer to address each of these determinants separately and leverage benefits of technology in the designated areas.

1. Size of the retail is defined in the study as the physical space and extent of operations. Semi-organized retailers operate with limited space and several other constraints like space, finance and expertise at the same time. Retailers may focus on the following:

a. Many pre-designed Merchandise Management software are available in the market which have components overlapping with different functional areas important to merchandise management. Semi-Organized Retailers should take stock of all the technology tools used in their store to check for any kind of overlapping to avoid confusions. This may help in easy understanding and use of deployed technology without incurring extra or unnecessary costs.

b. They may identify internal processes important to effective merchandise management like billing, stock keeping and reorders; and prioritize the areas for technology application. It is suggested that the retailers may get customized merchandise solutions developed, matching their requirements, in a cost effective manner. Keeping in mind their financial resource and employees readiness.

c. Growing emphasis on new products and variety makes it imperative for the retailers to maintain higher levels of stocks. Due to space constraints and bulky nature of consumer durable products, it becomes difficult to maintain larger stocks, it is suggested that they may vacate their space and free their capital by following Reverse Logistics practice. It includes identification and removal of any unsold and excess merchandise inventory from the merchandise management cycle by way of sales promotions and returning the identified stock to suppliers after negotiation.

2. Relations with Suppliers play an important role not only in ensuring availability of merchandise but they may also support in maintaining merchandise and selling of products. It is suggested that the semi-organized retailers may:

a. Deploy low cost technologies for sharing information in real-time with suppliers as information related to sales and merchandise inventory levels is an essential commodity to remain competitive.

b. Collaborate with their suppliers for managing their merchandise inventory on the basis of current market demand looking at the capital and space constraints. Retailers may ensure use of compatible technologies with that of the suppliers to integrate their merchandise management practices.

c. Survey concludes that daily footfall of customers in Semi-Organized Consumer Durable Retailers is

higher than the number of merchandise sold, indicating that the conversion rates are low. In order to convert more customers into buyers, retailers can seek help from suppliers, negotiate with them regarding additional support in the areas of selling products, by developing specific marketing strategies like exclusive advertisement and sales promotion for the stores and forecasting merchandise requirement.

d. The retailers can focus on their store layouts to increase visibility of products within store with the use of digital kiosks and signage.

3. Due to intense competition from organized and traditional retailers, semi-organized retailers are faced with challenges like creating differentiation, sustenance and earning profits while attempting to transform their operations in a cost effective manner, it is suggested that semi-organized retailers may:

a. Leverage their long term existence in the market and enjoy goodwill. These retailers may adopt Customer Relationship Management (CRM) practices for formulating well targeted strategies to establish a better connect with the customers to manage their existing long term relationship.

b. Create a differentiation by installing Digital Kiosks within stores containing detailed specifications along with the authentic time image of the product. A retailer may provide a mixed experience of a physical store as well as a virtual space for their customers. Customers would get to browse even those products which are not physically available in the store. On decision to buy the chosen product can be made available at the door step. This would also help the semi-organized retailers to address their space constraints.

4. Retail industry is undergoing significant changes in the merchandising process and other retail operations. Though they do have challenges in technology application yet they may adopt following measures to address the issues:

a. Semi organized retailers are reluctant to take on new technologies due to uncertainty of employee support, where they themselves are novice. In such cases retailers may use intuitive and user friendly technologies.

b. Financial constraints may negatively impact the technology application by semi-organized retailers. They may negotiate with technology providers for affordable solutions such as easy installments, credit option and pay-as-you go.

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