Demand Forecasting in the Indian Retail Industry

Applied Economics (HS 700)
Course Project Report

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Abstract

The retail business in India is expanding in leaps and bounds. With increasing competition, each retailer needs to correctly cope up with the impending demand. The retail firms need to take into account various factors including the lead time and the seasonality of goods. In this report, we study the various techniques used by retailers in India to perform demand forecasting and analysis. We present a case study done at Lakewood Malls Pvt. Ltd. where we understand that historical data and judgemental techniques are primarily used for forecasting of demand.

1 Introduction

The A.T. Kearney Global Retail Development Index showed India on the sixteenth position in 1995. In 2004, the publication said, "Despite India's stiff regulatory environment, it shines as the second star of the year, offering potential similar to that revealed by China 15 years ago." Though the comparison with China is sure to hurt the extreme patriot, she shall become forgiving on reading the mention in the next three year's publications. In the 2007 report, the GRDI mentions, "India: talk turns to action. For the third year, India tops the Index as one of the most attractive countries for global retailers. India's GDP is projected to grow by 9 percent in the fiscal year 2007—its highest growth rate in more than 18 years. Projections for 2008 are more than 10 percent, which will likely surpass China's projected rate of growth for the same period... the great Indian 'retail gold rush,' which we predicted last year, is now underway."

For an industry that is booming at the scale clearly evident from the A.T. Kearney reports, the parties involved have to look ahead in time and take proactive decisions to remain in business. The competition gets tougher day by day as more companies enter the market, and therefore survival in this market requires a lot of correct decisions involving forecasting of demand. For this project, we conducted a survey with a well known firm in the retail sector—Haiko. We found that Haiko uses only simple forecasting techniques based on data from few previous years.

1.1 Background

Historically,the Indian retail sector has been dominated by small independent players such as traditional, small grocery stores and others. Recently organized, multi-outlet retail concept has gained acceptance and has since then accelerated. Driven by changing lifestyles, strong income growth and favourable demographic patterns, Indian retail is expanding at a rapid pace. Mall space, from a meagre one million square feet in 2002, is expected to touch 40 million square feet by end-2007 and an estimated 60 million square feet by end-2008, says Jones Lang LaSalle's third annual Retailer Sentiment Survey-Asia.

Alongside, Indian cities are witnessing a paradigm shift from traditional forms of retailing into a modern organized sector. A report by Images Retail estimates the number of operational malls to more than double to over 412 with 205 million square feet by 2010 and further 715 malls by 2015, on the back of major retail developments even in tier II and tier III cities in India. The top ten players in Indian retail sector are

- Shoppers' Stop,
- Westside (Trent),
- Pantaloon (Big Bazaar),
- Lifestyle,
- RPG Retail (Foodworld, Musicworld),
- Crossword,
- Wills Lifestyle,
- Globus,
- Piramals (Pyramid and Crosswords),
- Ebony Retail Holdings Ltd.

Every good forecast requires not only valid historical data and meticulous documentation of demand but also a fundamental understanding of the methods used. In general, there are three factors that influence the accuracy of demand planning:

1. The product and market constellation
2. The forecasting horizon and lead times
3. The forecasting model and the planning team

Only those who comprehend the background and the methods of the models can interpret peculiarities, gauge forecasting errors, and recognize and validate the causal connections between external factors and demand. Another aspect that is equally important is to understand the industry and know the competition. In addition, planners need to be able to bring various departments and the company management together in order to promote the exchange of knowledge - a process that is vital for forecasting.

1.2 Objective

The objective of this project is to study the techniques employed by major players in the retail industry to study the trends and make predictions about the demand of various goods. Further, we want to investigate the difference between theoretical techniques taught in the class and those practically applied.

2 Challenges Faced in Demand Forecasting

A small retailer may not need and afford a full-fledged demand forecasting analysis. However, with increasing number of bigger retailers entering the market demand forecasting becomes feasible. Firms face a multitude of challenges due to the following factors:

1. scale of forecast (how many goods to include in the forecast?)

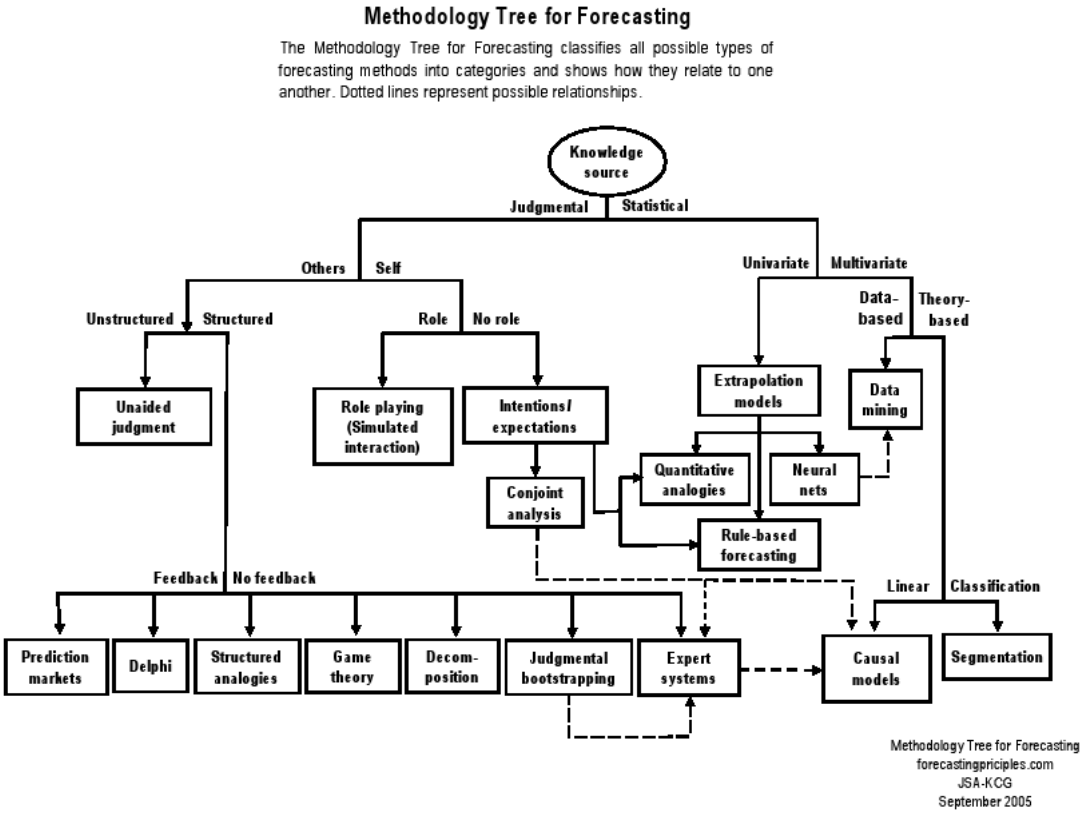
2. sporadic demand (erratic sales for many items in the store)
3. introduction of new goods
4. changing prices and promotions

Largescale forecasting. A big retailer may have thousands of items per shop. Since forecasting is an important yet expensive task, the retailer can not forecast for all goods it sells. Though it is infeasible to manually forecast the demand of all the products, it is possible to use automated tools to do so. In most cases, quality forecasts can be obtained from the automated tool and the expert analysts can be employed to forecast few of the most important products. This reduces the burden from the humans but requires lot of compute power available.

What to optimize. Total sale volumes, total revenue earned, total profits, maximize margin are many different objectives that a firm may use and may receive optimized "goods in stock". Creditability of such optimization decisions pivots on the ability to correctly predict the sales. This is usually based on prior data about the same product or close substitutes. It may also be based upon analysis done at another location with similar buyer patterns.

When to restock. Slow moving goods may be restocked leisurely compared to fast moving goods. It is important for retailers to provide the customers the specific goods that the customer asks of the retailer. Under stocking would cause unsatisfied customers who may quickly move to other stores. Over stacking may increase the money locked up in inventory. Hence, the retailer should aim at a replenishment policy by which the rack never gets empty and never overflows. When close substitutes are available for some products, the retailer may compensate for a lower current stock in one good with another one.

3 Theoretical Framework



Demand forcasting techniques are broadly divided in two categories: *judgemental* and *statistical*. Each of the methods are described in following sections.

3.1 Judgemental

The main methods in these category are as follows:

Unaided Judgement. It is common practice to ask experts what will happen. This is a good procedure to use when,

- experts are unbiased,
- large changes are unlikely,
- relationships are well understood by experts (e.g., demand goes up when prices go down),
- experts possess privileged information,
- experts receive accurate and well-summarized feedback about their forecasts.

Delphi. To forecast with Delphi the administrator should recruit between five and twenty suitable experts and poll them for their forecasts and reasons. The administrator then provides the experts with anonymous summary statistics on the forecasts, and expert's reasons for their forecasts. The process is repeated until there is little change in forecasts between rounds - two or three rounds are usually sufficient. The Delphi forecast is the median or mode of the expert's final forecasts.

Judgemental Decomposition. The basic idea behind judgemental decomposition is to divide the forecasting problem into parts that are easier to forecast than the whole. One then forecasts the parts individually, using methods appropriate to each part.Finally, the parts are combined to obtain a forecast.

Expert Systems. As the name implies,expert systems are structured representations of the rules experts use to make predictions or diagnoses. For example, if local household incomes are in the bottom quartile, then do not supply premium brands.

Expert systems forecasting involves identifying forecasting rules used by experts and rules learned from empirical research.

Developing an expert system is expensive and so the method will only be of interest in situations where many forecasts of a similar kind are required. Expert systems are feasible where problems are sufficiently well- structured for rules to be identified.

Simulated interaction. Simulated interaction is a form of role playing for predicting decisions by people who are interacting with others.

To use simulated interaction, an administrator prepares a description of the target situation, describes the main protagonists roles, and provides a list of possible decisions. Role players adopt a role and read about the situation. They then improvise realistic interactions with the other role players until they reach a decision; for example to sign a trial one-year exclusive distribution agreement. The role players decisions are used to make the forecast.

Intentions and Expectations Survey. With intentions surveys, people are asked how they intend to behave in specified situations. In a similar manner,an expectations survey asks people how they expect to behave.

To forecast demand using a survey of potential consumers, the administrator should prepare an accurate and comprehensive description of the product and conditions of sale. He should select a representative sample of the population of interest and develop questions to elicit expectations from respondents. Bias in responses should be assessed if possible and the data adjusted accordingly. The behaviour of the population is forecast by aggregating the survey responses.

3.2 Methods Requiring Quantitative Data

Here historical data is needed and mathematical methods are used for forcasting.

Extrapolation. Extrapolation methods use historical data on that which one wishes to forecast. Exponential smoothing is the most popular and cost effective of the statistical extrapolation methods. It implements the principle that recent data should be weighted more heavily and smoothes out cyclical fluctuations to forecast the trend. To use exponential smoothing to extrapolate, the administrator should first clean and deseasonalise the data, and select reasonable smoothing factors.

Quantitative Analogies. Here expert opinion is used to identify the situation which is similar to the current situation and the data about that is available.

4 Existing Surveys

The Indian Retail Report 2007 released by Kamal Nath on January, 09, 2007 mentions the following key aspects about the Indian retail industry.

- After leading the IT bandwagon, India is poised to grow as a Retail hub. It is imperative to sustain the modernization of the retail sector and dispel the myth that the game is big Vs small or traditional Vs modern or organized Vs unorganized or local Vs foreign. What is needed is to create an appropriate environment to propel retail where all benefit.
- India has a huge population that has the potential to consume if given the power of spending and that is only possible through large scale development, generating employment which is already happening.
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- India has a huge population that has the potential to consume if given the power of spending and that is only possible through large scale development, generating employment which is already happening.
- Escalating real estate cost, scarcity of skilled workforce and structured supply of merchandise are the key challenge areas for the retail growth.
- Revealing key figures from the India Retail Report 2007, Amitabh Taneja, Chief Convenor of India Retail Forum said that the organised sector accounted for Rs.55,000 crore ($12.4 billion) business at current prices in the calendar year 2006 increasing its share to 4.6% of the total Indian Retail Value that stood at Rs.12,00,000 crore ($270 billion). Going by the current growth trend and considering the fact that existing prominent players in organised retail have stepped up their expansion drive with Reliance announcing big plans and other Indian corporate houses too evincing keenness on investing heavily in this sector as also the inking of the joint-venture between the world's largest retailer Wal-Mart and Bharti—the organised retail in India has indeed gained top speed and is now on the verge of take-off.

- Of the Rs.12,00,000 crore retail market, Food and Grocery retail is by far the single largest block estimated to be worth a whopping Rs.7,43,900 crore, but the share of organised sector in this is miniscule. Clothing, textiles and fashion accessories constitute the second largest block, but the largest segment as far organised retailing is concerned is the timewear sector with nearly 46 per cent share of the segment being organised. Moving forward, organized retailing is projected to grow at the rate of about 37 per cent in 2007 and 42 per cent in 2008.

- As India emerges as one of the most potential markets for global brands and retailers and retail reinvents the way modern Indians celebrate their spending power, India that takes pride in its rich culture, heritage, art, craft and variety of wares must capitalize on this ever escalating trend and channelise the spending towards healthy consumption for overall development of the country.

The Information for this survey has been sourced from books, newspapers, trade journals, and white papers, industry portals, government agencies, trade associations, monitoring industry news and developments, and through access to more than 3000 paid databases. The analysis methods include ratio analysis, historical trend analysis, linear regression analysis using software tools, judgemental forecasting, and cause and effect analysis.

An article by "Tata Strategic Management Group" in September, 2006 estimates the retail market to grow to about Rs.40,000 crore by 2015. It sights three important global trends and infers its implications for India.

1. When retail markets develop, there is a consolidation of players with fewer large players dominating the market.

2. Eventhough supermarkets may emerge at the initial stages of retail market development, in the long term they are unable to match the consumer value proposition of convenience stores and hypermarkets.

3. Private labels provide the retailer an ability to offer a significant price advantage to consumers.

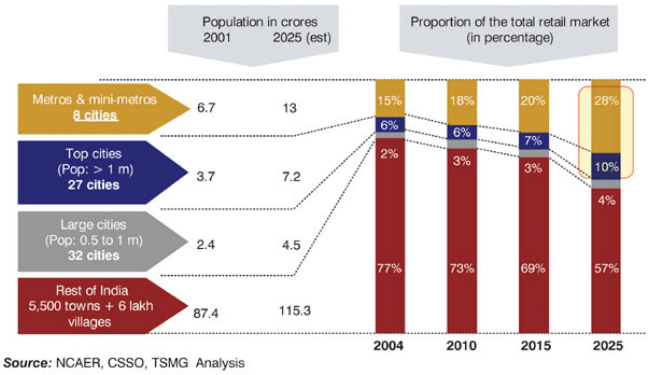
The implications inferred are that

1. Existing and new entrants need to achieve scale quickly to drive efficiencies in procurement, supply chain and marketing. Else, they risk being marginalised by larger players.

2. Real estate and human resources will be the critical drivers to build scale.

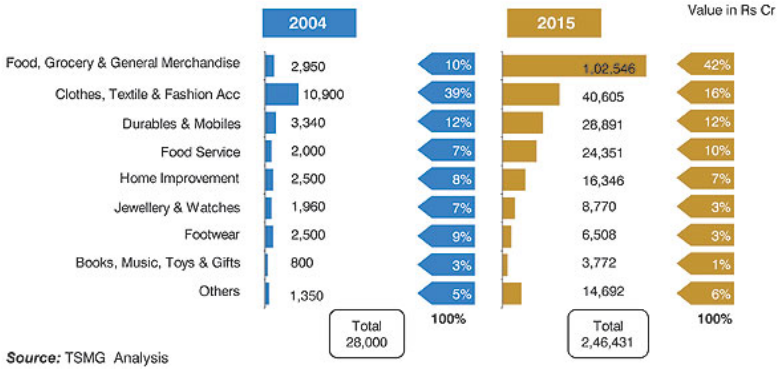
3. Retailers that invest in training will be able to ensure the availability of quality manpower in a rapidly growing market.

This analysis also emphasises on the fact that majority of revenue generation can be done through retail business aimed at the metropolitan cities and other big towns in India.



Source: NCAER, CSSO, TSMG Analysis

A breakup of the predicted growth in the retail sector shows a substantial increase in the "Food, Grocery and General Merchandise" section. This prediction is important since it indicates that a retailer who does not build up the infrastructure to support these goods may miss upon big opportunities in the future. This category contains perishable goods and hence requires special handling. Procurement of food may require long term contracts to remain competitive in the market.



Source: TSMG Analysis

An interesting observation by the "Indian retail: on the fast track" report by FICCI was that different organized retailers are currently experimenting with different formats of retail trade. Since the Indian market is as yet not mature enough, it is hard to predict which of the formats will have a winning edge over all others. This points to a possibility that internationally accepted formats may not be applicable or may not yield as good results in India as in other countries.

Formats adopted by key players		
Retailer	**Original formats**	**Later formats**
RPG Retail	Supermarket (Foodworld)	Hypermarket (Spencer's) Specialty store (Health & Glow)
Piramal's	Department store (Piramyd Megastore)	Discount store (TruMart)
Pantaloon Retail	Small format outlets (Shoppe) Department store (Pantaloon)	Supermarket (Food Bazaar) Hypermarket (Big Bazaar) Mall (Central)
K Raheja Group	Department store (Shopper's Stop) Specialty store(Crossword)	Supermarket (TBA) Hypermarket (TBA)
Tata/Trent	Department store (Westside)	Hypermarket (Star India Bazaar)
Landmark Group	Department store (Lifestyle)	Hypermarket (TBA)
Others	Discount store (Subhiksha, Margin Free, Apna Bazaar), Supermarket (Nilgiri's), Specialty Electronics (Vivek's, Vijay Sales)	

Source: KPMG in India analysis 2005

Supermarket. A supermarket is a self-service store offering a wide variety of food and household merchandise, organized into departments. It is larger in size and has a wider selection than a traditional grocery store and it is smaller than a hypermarket or superstore.

Hypermarket. Variation of a supermarket that offers a variety of nonfood items, such as appliances, clothing, and services, in a vast space much larger than a regular supermarket, sometimes in excess of 200,000 square feet; also called superstore. The grocery items are often priced below market to draw traffic into the store; however, the grocery selection is also more limited than in a regular supermarket. Originated in France, the hypermarket has had limited success in the U.S. Due to consumer resistance to the limited grocery selection and the warehouse atmosphere. Success in Europe is attributed to the fact that fewer alternatives are available. Compared to regular supermarkets, a large volume of goods must be sold to break even.

Discount Store. A store that sells merchandise, especially consumer goods, at a discount from the manufacturer's suggested retail price. Also called discounter or discount house.

Speciality Store. A speciality store is a store, usually retail, that offers specific and specialized types of items. These stores focus on selling a particular brand, or a particular type of item. For example, a store that exclusively sells cell phones or video games would be considered specialized.

Department Store. A department store is a retail establishment which specializes in selling a wide range of products without a single predominant merchandise line. Department stores usually sell products including apparel, furniture, appliances, electronics, and additionally select other lines of products such as paint, hardware, toiletries, cosmetics, photographic equipment, jewellery, toys, and sporting goods.

This report reasserts the need for proactive training that was already highlighted in the Tata report. The retail industry is thus seeing a shortfall of talented individuals to take ahead the retail industry. Lack of human resources can impair an industry to a large extent. Most retailers already implement in-house training programs and send their employees to major seminars and summits. However, what may be required is more formal training in the form of courses held in colleges and professional tie-ups. If the lack of talented individuals continues to increase, attrition may set in.

Another report by Mrs. Madhuri Mathur a faculty at ICFAI National College has mentioned a lack of retail friendly laws as a challenge faced by the industry. Free movement of goods from one state to another is currently not possible. The report says that retailers could make appropriate use of availability and surplus if the laws would be relaxed.

5 Our Survey

On March 17, 2008, we visited Haiko, a division of the Lakewood Malls Pvt. Ltd. at Hiranandani Gardens. We were fortunate to have an opportunity to speak with Mr. Gaurav Purohit and gain some insights in the area of retail demand and forecasting. We present below a recompiled version of the interview we held with Mr. Purohit.

Do you do forecasting? Yes, we do. However, we do not perform major statistical forecasting of the tune of the larger stores. We are smaller in scale and so is our forecasting. The kind of forecasting you want to study is done mainly by those retailers who also are a brand label, such as Westside.

*What are the key aspects of a forecasting exercise?*There are many. Here are a few I can think of right now.

1. Beginning Early - building forecasting model takes time
2. Taking expert inputs - consulting a modelling company can add advantages of cross industry learning
3. Avoiding over- dependence on tools - statistical packages can do data analysis, but they cannot replace domain expertise
4. Thinking of multiple solutions - there is no single solution for sales forecasting of all the products
5. Playing one's role - modellers build the model and domain people provide business insights
6. Be on the field - it is important to get first hand information from the field where the actual action is present.

How is the forecasting done? There is a substantial difference between the way things are done practically and the once taught in school. We primarily look at past two-three years of data and our targeted growth in the particular good to predict the volumes of sale. However, we do not apply any formulae to arrive at the answers. We have to get involved more personally and be judgemental. Taste and trend are subjective terms and hence requires much more than just theoretical knowledge.

What are some tips for developing a forecasting model for new product? The only way to come out with even a close to accurate forecast for new product is to try out different forecasting techniques which are applied to products with similar features. The data for forecast has to be arrived from historical substitution which is a feature in most of the forecasting tools. Try out a different model with a different set of data. Try out models for a specific period and measure the forecast errors for the same. The one model which gives the most reliable result will fit your need.

What is the typical growth rate of the retail industry? Typically, the growth rate is between 15-20

How do you categorize goods? What are the factors you consider while doing that? Some goods are seasonal. They need to be sold in that time frame. Certain other goods are stable with more or less even sales throughout the year. There are internal constraints like batch size, third party manufacturing lead-time, availability of raw material and skilled labour.

Could you share with us an example story? Sure. Let us take school shoes as an example. It is a seasonal product. We look at the past three years of data about how many pairs of shoes were sold. Shoes are classified as shoes for girls and boys. Further classification is done in the boys shoes as black shoes or sports shoes. Each of these categories have various sizes to consider too. We have observed that shoes sold to children in the 8th and 9th standard are getting more trendy these days. For this analysis we also measure the footfall (number of people actually visiting the store) and estimate the number of children visiting. We have to decide what brands to buy from and how much quantity. This can be inferred from the price tags of the brands and the estimates of the buying capacity of our customers. We have to keep the correct mix of all type of goods. Forecasting pays off in the form of increased sales due to the ability to bring in the correct amount of stock of the correct type. Timing is also very important. We cannot bring in school shoes very late with only a few days left for opening of the schools. Planning for this summer season is already done and the plans are beginning to get executed.

What is the period of time in the future for which you do forecasting? Forecasting is done on a six monthly basis in the retrial industry. The production time is considered to be 60 days. Hence we usually place orders at least 2 months in advance. For the Diwali season, the forecasting study is stated sometime in March. For the summer season, it is done in October. However, forecasting is more crucial for manufacturing firms. We only place orders and if the order cannot be fulfilled within the time window we have, then we look for substitutes through possibly other brands.

How does forecasting helps to increase sales or efficient allocation of human resources too? Since we are not in manufacturing of goods, we are more focused on increased sales volumes. We have fixed human inventory and lesser tasks to redirect them to. Specifically, the sales people at the store are the only

human resources involved. In a manufacturing firm, on the contrary, worker effort may be redirected towards manufacturing rapid moving goods or goods with higher profits. In their case, forecasting has a bearing on both the factors you mentioned. Of course, everything can be measured in terms of money and redirecting effort to the right goods enhances total revenue.

Does the volume of sale have a bearing on the rack space you allocate to a specific good? It is usually the other way round. We have a fixed rack space and that dictates how much we can stock.

Does forecasting have a relation with advertisements? Yes, surely. But we do not advertise any specific product. We advertise our outlets. Mechanisms used for advertisements are newspaper, hoardings etc. Target audience for advertisement is mostly local within a radius of about 4-5km. People have stopped travelling too much just for shopping.

When a customer does not get what he was looking for in the store, he usually just leaves without conveying to you what he had come there for. In such a scenario, how do you know what goods are selling? We have routine meetings with the front-end team and they convey what items were looked for but unavailable. Also, items that are fast moving, stand out due to higher sales volumes.

Could you relate a failure story? We had taken a decision about stocking large multicolored umbrellas thinking that it will be a new trend. However it did not work out to be so and we ended up sitting on a large inventory. Liquidating these assets can be done in many ways. One popular way is to organize sales which is done every now and then to get these goods moving. Another way is to make company tie-ups in which a firm gifts its employees such goods and we sell the item at a discounted price.

Is more money invested on a non-moving good in the form of advertisements or promotions? It is only done so if it is economically viable. If we feel that the revenue generated by liquidating the goods shall exceed the cost incurred on the advertisements, we go ahead with it.

For all the analysis do you use software? Yes, of course. We prefer making Excel sheets since they are simple to create and serve our purpose well (since we work on a small scale).

We attempted to interact with various other firms including D-Mart, Big Bazaar, Pantaloons, and Westside. However, their forecasting teams were either unavailable or unreachable. We would have particularly liked to conduct surveys at Westside since they are a label unto themselves.

6 Conclusion

The Retail sector in India is growing at a magnificent pace and the increasing competition is compelling retailers to use demand forecasting tools. Retailers who have their own brand labels use the forecasting techniques of the kind we study in theory. This is because their prediction of sales directly affects their manufacturing. For these retailers, forecasting is done for a longer time duration and involves substantial amounts of asset cost. On the other hand, small scale retailers can employ qualitative techniques on the historical data and considering the behavior trends in the market. They can easily find substitutes to fill up

their rack space. Also, stakes involved in a product are lesser. They may find it easy to liquidate assets through sales, direct contracts with other shops and the corporate sector. Demand forecasting, thus, remains a critical tool that plays key roles in manufactoring, advertising, placement, allocation of resources

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