Scope of Lean Management in Kirana stores and Supermarkets

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Abstract: This paper deals with the detailed study of functioning of super markets and kirana stores in Indian context. A basic comparative study is done to analyze the scope of lean management in the same. A survey is conducted in supermarkets and kirana stores. Kirana stores often operates for a small circle wherein the customer churn rate is lesser as compared to the supermarkets. This paper deals with the analysis of various aspects of a kirana store and supermarkets which would fuel up the comparison in the context of lean. The study has focused on certain parameters which are key attributes of lean management in service sector. Which includes product replacement, shelving, waiting time at counters, product arrangement (FIFO). The concept of JIT would also help the main focus of all kirana stores and supermarkets, which is "cost minimization and profit maximization". Wilcoxon rank test is conducted to analytically study the difference in the scope of lean application in kirana stores and supermarkets. The study deciphered the opportunity of lean in supermarkets than in kirana stores as per the limitation in the operation. The mode of operation in kirana stores has slight variations with respect to management. And hence it is difficult to commonly suggest ways to improve functions, but still sees a scope in future. The results were favorable to supermarkets, wherein lean application sounds more result oriented and suits the functioning of huge retail chain.
Keywords: FIFO, JIT, Wilcoxon rank test, lean management

I. INTRODUCTION

In this digital era, where people are more found of online shopping, there are still an appreciable category of shopaholics, who would never compromise the satisfaction of feeling the product and choosing from the rack. This helps the retail sector have a firm grip on offline Indian market. Whereas, kirana stores are said to have established their hierarchy in village and small towns. The customer flow in kirana stores are considered to be less compared to supermarkets. But customer churn rate wobbles in supermarkets. The reason behind this may be because of a promising relationship between the customer and the store owner. There are various factors to be emphasized on as far as lean is considered in kirana stores and supermarkets. This paper deals with this comparison and reflects the implications of lean management techniques in super markets and kirana stores. And this is done with the assumption that there is no lean management in current operation of the stores.

People are too much busy and impatient to cop up with the loss of time, energy, cost etc., which would probably be solved when an innovative appeal, brought to the store's operations. Amid all the uncertainties confronted by the kirana store, the study throws light to a finite happy ending store management, by suggesting various techniques to handle the loopholes obtained from the study. During any crisis, kirana stores work well for meeting basic needs and sustains its function when the customers turn to supermarkets, once things get back to normal. It is observed that Kirana stores are more serious about avoiding loss, and hence they manage the products accordingly. On the other hand supermarkets focus more on profit and encounters unexpected ups and downs. In Supermarkets, products have a seasonal ups and falls, while in kirana stores, it's found to be rare, business seems to be stable. Kirana Stores operate in less than 500 sq. ft whereas supermarkets require a minimum of 2000 sq. ft and as an advantage of economies of sales over kirana stores. Supermarkets has an inbuilt profit making history while the small scale sectors somehow manage to withstand by the reduced operation cost.

II. LITERATURE REVIEW

1. "Supermarkets Vs Small kirana stores"

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With coming up of new supermarket day by day poses great threat for small scale industries a lot .In our field of study kirana stores are greatly affected by these supermarket chains. The reasons are many few among them are our government is on double mind whether to invite 50% in FDI for retail sector or to protect the kirana stores. The fact is obvious as kirana stores are struggling to cope up with the changing trends. Weightage has to be given for arranging of products, organizing, inventory management and if those can be improved we can see some changes .Social status has changed among the youth sector which comprise of 55% of our population .Trust is what still exist on Kirana stores for generations than fast sprouting Malls .Kirana stores lacks in rapid change of commodities and price. Card accessibility is not there as most of our generation won't carry cash. Social indulgence is lacking in Kirana stores such as birthday wishes, special occasions over malls

2. "The Effects of Application of Lean Concept in Retail"

Radojko Lukić on 28 March 2018Lean in this modern era is an unavoidable tool which all implements from Manufacturers to retail end.

Despite tough competition in market and high changing demand it's still rules the market. The main aim of lean to gain on lower price without holding onto unnecessary stocks. Reduce the piling up of unnecessary stocks thereby churning that into profit on quick rotation.The advantage in market wiil be increased utility of fast moving goods and less waste in near expiry products. The concept of lean is a combination of lower retail inventories and more frequent filling in the shop. With lower inventories at the store, retailers will not have a large amount of unsold goods under the terms of a collapse in demand. The concept of lean retailing is to give quick response to fluctuations in demand rather than holding large stocks. The movement distance has been cut short from suppliers to sales locations.It has to rely on demand and with market fluctuations and customize according to "Customer trends".

3. **"Lean thinking with improvement teams in retail distribution"**:

Carmen Jaca∗, Javier Santos, Ander Errasti and Elisabeth Viles

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For companies to survive in this modern era they have to adapt to rapid change in demand for new products for assuring their survival. This paper presents a study on how lean can be implemented on Supermarket and how well it suits Kirana stores for the win-win situation. The main objective being how well the lean can be made into practice for improving overall performance. The study offers a real hands on experience on how we can make the adoption of lean techniques for overall change. In our initial study with supermarket and kirana reveals about the outdated, inefficient and manual entry process followed which is time consuming and wasteful. While trying to analyze the scenario important implications were revealed.

- No control over inventory rotation
- No centralized system for monitoring the stocks all are ordering and re-ordering without even checking
- No internal motivation happening of any sort
- Pushing products based on incentive scheme
- No customer centric products. For example: Colgate tooth paste different flavors were not available. Nor customers are same
- No specific product no sales will end up in zero profit
4. **"Supply Chain Management And Lean Six Sigma in Retail Environment"** by North Dakota State University of Agriculture and Applied Science by Brittain Cliff Ladd (2013)

Results of the study revealed the factors hindering successful supply chain management and process execution. First being lack of process improvement strategies and lack of departmental logical collaboration. As in all scenarios, however, long-term success will depend solely on the ability of managers and employees, to reinforce the need to follow the new processes day in and day out.

5. **"A Novel Model for Benchmarking the Performance of Retail Stores for Retail Operations using Lean Manufacturing Approach"**

International Journal of Applied Engineering Research ISSN 0973-4562 Volume 12, Number 17 (2017) by Mwafak Shakoor1∗, Nasser Jaber, Wisam Abu Jadayil1, Mohamed Qureshi2 and Samar Jaber

In the study conducted lean approach has been utilized to determine the efficiency of retail services in Kirana and supermarket at several locations spread around Vallikavu and Karunagapalli in Kollam district, Kerala. The study has been done and new benchmark approach can be made into practice which utilize in the morning time period to significant possible savings and eliminating waste reduction. A conclusion can be drawn as some cashiers can be moved from the morning time to peak hours as in our case evening timing will be most preferred. In supermarkets, as these times customers will be more, movement of stocks will be fueled up and overall employee satisfaction will also be there which in turn improves the retail service in supermarket.

6. **"Integration of Lean Operation and Pricing Strategy in Retail"**

Toru Noda University of Tsukuba, published in Journal of Marketing Development and Competitiveness (2015)

The purpose of this study is to clarify whether lean operation and stable pricing such as everyday low price for developing an alternative business model to successfully compete with large retailers. We observed that lean can be successfully applied to retailing and stable pricing becomes a driver for successful implementation of lean operation.

This study clarified that lean can be successfully applied to retailing to become an effective alternative to scale. It's been noted that lean can be successfully implemented if there is stable pricing all the time. A low cost model must be implemented to improve the performance. This study shows how lean affects the retail market in eliminate waste and piling up of non-moving stocks. This study does not take into account, market trends, relationship with stake holders and managerial capacity need to be considered.

Since the few kirana stores and Supermarket did not disclose financial information in public, all are created upon public information and assumptions from interviews.

III.METHODOLOGY

In order to find the flaws in both kirana stores and supermarkets, a survey was conducted and two different questionnaires were built based on the functionality of small scale and large scale stores. The difference is observed to be only in the capacity of management, but the intention of functionalities remain the same, which is to maximize profit with minimum cost which includes wastage in terms of money, labor and time. The questionnaire emphasized on the difficulties faced by the stores, to validate it and to know how the issues where tackled by the management. The qualitative study was conducted in 10 supermarkets and 10 kirana stores.

The results are validated with the commonly observed loopholes which emphasize the study and helps suggest a possible solution which are used to derive results in non-parametric test, which adheres to waste less profit maximization. Analytical test method used is Wilcoxon method for related samples, to compare the data from kirana store and supermarket, and to weigh the scope of lean in both. The main area of observation was on product arrangements and management of stock, which caters to lean management. The questionnaire has emphasized on the lean aspects, expected in a store, like product arrangement, shelf life, stock management, queuing/waiting time.

IV. LIMITATIONS OF STUDY

The study is confined and precise

This study brings forth an idea of how the lean operations would lead to profit maximization, but not implemented yet. This is just a basic study on how kirana stores and supermarkets could survive even during a pandemic. But could not guarantee a 100% success since the study has been confined to just analysis and possible suggestions.

V. ANALYSIS

The qualitative analysis part makes the study more transparent wherein, it gives an idea on how the research has progressed and unleashed a solution. The sample size taken is 20 From 10 supermarkets, the possible key questions and related statistical inference is given below, the parameters are chosen based on its reliability in the study of lean operations. The following are mostly the loopholes in to which we must concentrate on to reach a viable solution SUPERMARKETS
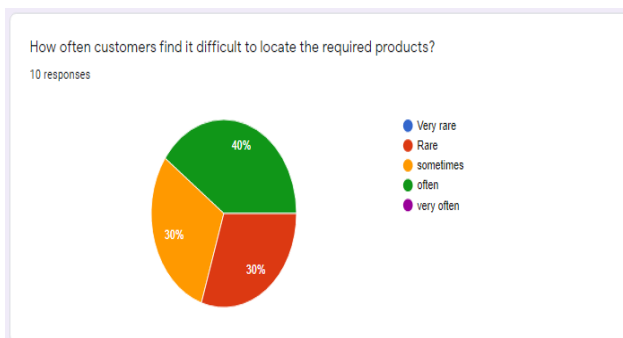
1. Customer convenience in locating

Fig. Customer convenience

It is observed that 40% of the stores say that salesperson will have to guide customers to their destination, rather finding by themselves. This brings a burdened toil in salesperson and customers as well. It must be easily located by providing customers with proper guidance at the entrance, by means of printed bulletin boards. This reduces the chance of customer churn, and would lose them to online platforms, where it' just matter of seconds to find a product.
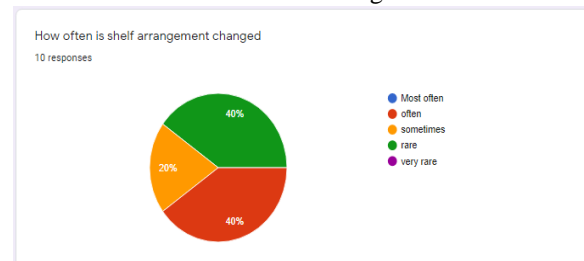
2. Shelf-arrangement

Fig. Shelving

Changing shelf arrangements based on the movement of the product helps reduce the stock easily. Customers would not miss out any of them. It is even reliable to arrange based on popular brand.
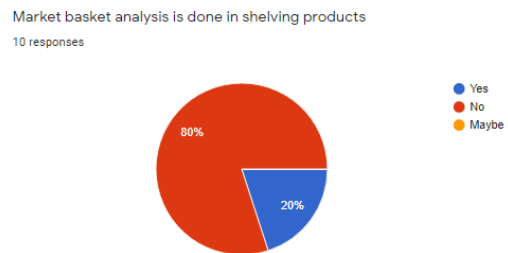
3. Market-Basket-Analysis

Fig. Market basket analysis

It is an analytics technique to sort out proper combination of purchase, which would help in shelving and displaying the products based on it. It could be taken from the purchase history of each customer from the database. This works well with regular customers. This would ease supply of product and helps reduce freight charge in delivery process.
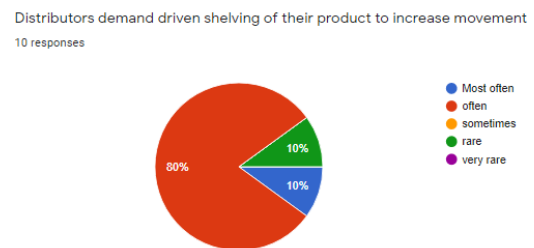
4. Demand driven shelving

Fig. Demand driven shelving

Shelving should always be customer demand driven and not distributor's choice. It is observed that 80% of the stores taken for this study, has a distributor driven shelving technique, which leads to stock retention, and huge loss on expiration.

5. Waiting time

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How often customers reach for card swiping

10 responses

Always
often
sometimes
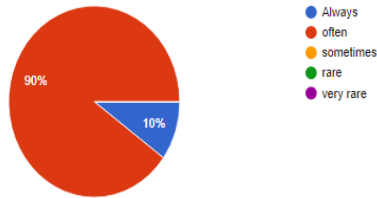rare
very rare

90%
10%

Fig. Card swiping frequency

90% of the stores find customers more prone to usage of debit/credit cards for their purchase. This could be an opportunity to bring in cashless online payment for customers, who can access their bills online via mail or SMS, which may reduce the waiting time at the counters. Mostly card swiping increases the waiting time in any case of technical issues and customers as observed to wait for so long for their voucher.

6.   Product-replacement

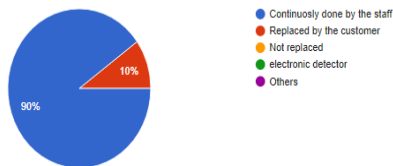How are the products replaced when they are misplaced by the customer?

10 responses

Continuosly done by the staff
Replaced by the customer
Not replaced
electronic detector
Others

90%
10%

Fig. Product placement

In 90% cases, the misplacement is handled manually, which requires more labor, and in turn may require more manpower. In some cases (10%), products are kept back by the customers, when they find it doesn't serve them. This can be rectified by implementing detectors or alarm, when the rack is placed with the wrong product, which could be possible by bar code duplication, using sensors. This will reduce the chances of fake stock outs and enhance the stock management during festival seasons. This would also help in detecting the number of expired products replaced.

7.   Discount sales

Discounts are offered on products about to expire
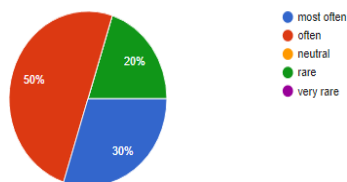
10 responses

most often
often
neutral
rare
very rare

50%
30%
20%

Fig. discount sales

This triggers a spontaneous recover of huge loss which would crash the entire profit made out of other products. This should be raised from 50% to 80% of the supermarkets. This also reflects a possibility of Kanban system in supermarkets, pertaining to the huge quantity of waste stock management and cost reduction. When stocks are filled only based on the tickets raised from respective department in the

supermarket, it dilutes the effort of the distributors to manage stock and reduces freight charge.

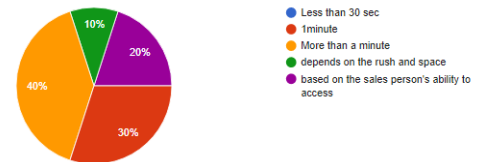KIRANA STORES

1. Discount sales

Is there discount sales prior to the expiration of products

10 responses

very often
often
sometimes
rare
very rare

50%
30%
20%
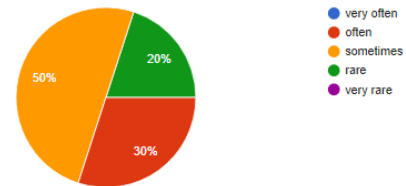
Like the supermarkets there should be a raised figure for discount sales, which would contribute to waste less management, with respect to the prevailing huge loss encountered by Kirana stores in the trend of online stores and supermarket.
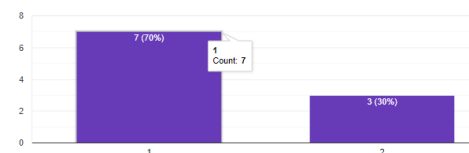
2. Waiting time

How long customer takes to feel, experience the product?

10 responses

Less than 30 sec
1minute
More than a minute
depends on the rush and space
based on the sales person's ability to access

40%
30%
20%
10%

In most of the Kirana stores, the study unleashes the fact that less manpower has increased the waiting time which in turn fuels loss. When the customer finds it time consuming, there are many other options available, as the bargaining power of kirana stores is declining. Amidst large retail chains, kirana sores must be so vigilant in all operations. Queuing reduces the reliability of the store. By raising more manpower, this could be sorted out. The chat given below shows the result of 10 kirana stores, among which 70% store has just 1 sales person. Mostly kirana store meet emergency needs of customers, where waiting time would have to be paid.

Number of sales persons

10 responses

7 (70%)
1
Count: 7

3 (30%)

Waiting time of customers are also dependent on the payment mode. Cash payment is most prevalently observed mode of payment, which curtails the productive time of the sales person and customer as well. Most of the kirana stores could opt out for online payment , or atleast using a card swiping machine.
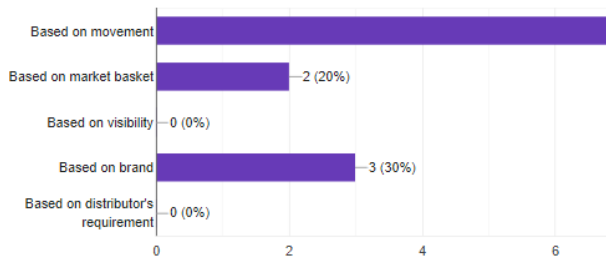
This also attracts more young customers who don't prefer to carry currency as such.

Mode of payment
10 responses
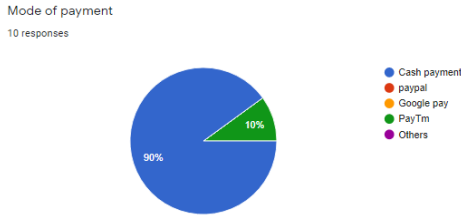
The options made available to the sample size was as follows: Cash payment, Paypal, Google pay, Paytm, others. Here cash payment tolled the highest.

3.Shelving

Attributes considered in shelving products
10 responses

FIFO approach would increase the visibility of products running out of its expiry date, and would help vanish stock retention. The products must be stacked based on the visiibilty rather considering their demand. At the same time movement enhances the product management, which should be maintained(70%).The products must be ordered adhering to the Just In Time (JIT)lean concept. Ths would help reduce backlogs, and help profit maximisation.Ttheir will be proper sales flow.

VI.WILCOXON RANK TEST RESULT

Three parameters were taken for the rank test which determined the possibility of lean application and weighed the scope of lean in kirana stores and supermarkets.The three parameters are three questions regarding the management's approach towards the lean application. The three parameters are related to product placement, application of FIFO in shelving, and misplacement detection.

The mode of operation of kirana stores meets the daily needs of customers, where there is least chance of bulk purchase. Despite this situation, they keep their margins higher than supermarkets, where products are sold for offers, to attract bulk consumption. This is done to hit the market and have a grip in tough times. The pricing is not a flexible as in supermarkets.

On the other hand supermarkets fails to finsh the stock, which is a serious problem. But more open to lean principles, and finds mre opportunity. While in kirana store, it dis difficult and has limitation in lean system of operation due to the layout of the store. The wilcoxon test result says that it would not be reliable to iplement lean principles in kirana stores, where it may incur huge cost, wherein the profit margin will again have to be raised to meet breakeven. Below given is the rank test based o the response regarding implementation of lean in product placement.

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Kirana	10	2.70	1.889	1	5
supermarket	10	3.00	1.563	1	5

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
supermarket - Kirana	Negative Ranks	2[a]	3.00	6.00
	Positive Ranks	3[b]	3.00	9.00
	Ties	5[c]		
	Total	10		

a. supermarket < Kirana
b. supermarket > Kirana
c. supermarket = Kirana

Test Statistics[a]

	supermarket - Kirana
Z	-.412[b]
Asymp. Sig. (2-tailed)	.680

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

In the result it is clear that supermarkets has more inclination to lean methods of market basket analysis, product placement based on brand, visibility etc. While in kirana stores, due to infrastructure limitations, it is most not preferred, which gives more negatives ranks. Supermarkets has more positive ranks, which evidently shows the opportunity of more lean applications in near future.The cost of implementation is another problem faced by kirana stores wherein supermarkets bounces it back from drawing maximum profits, especially during seasons.

FIFO method

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Kirana	10	2.00	.816	1	3
Supermarket	10	1.70	.675	1	3

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Supermarket - Kirana	Negative Ranks	4[a]	3.75	15.00
	Positive Ranks	2[b]	3.00	6.00
	Ties	4[c]		
	Total	10		

a. Supermarket < Kirana
b. Supermarket > Kirana
c. Supermarket = Kirana

Test Statistics[a]

	Supermarket - Kirana
Z	-1.000[b]
Asymp. Sig. (2-tailed)	.317

a. Wilcoxon Signed Ranks Test
b. Based on positive ranks.

FIFO methd of product shelving helps reduce the risk of product retention and reduces wastage. This would also be pssible by implementing Just In Time stock replacement.In FIFO method te products nearing expiration period will be mad emore visible to customers in the rack, with offers. While the new products will be stacked behind with no offers.This would help move the product from the rack quickly, diminishing the opportunity cost of top demanded products. It is always reliable to get the shelf space emptied soon to get it refilled, inorder to bridge the gap of cost of management and profit.

Product replacement

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
Kirana	10	1.20	.422	1	2
Supermarket	10	1.30	.483	1	2

Wilcoxon Signed Ranks Test

Ranks

		N	Mean Rank	Sum of Ranks
Supermarket - Kirana	Negative Ranks	1[a]	2.00	2.00
	Positive Ranks	2[b]	2.00	4.00
	Ties	7[c]		
	Total	10		

a. Supermarket < Kirana

b. Supermarket > Kirana

c. Supermarket = Kirana

Test Statistics[a]

	Supermarket - Kirana
Z	-.577[b]
Asymp. Sig. (2-tailed)	.564

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

The test result decifers the possibility of lean in supermarket than in kirana stores. The response from 10 kirana stores indicated that none of them preferred electronic detectors to replace the misplaced products. Manual replacing was most preferred to minimise cost, as implementation of electronic detectors is not pocket friendly for kirana stores.But has great opportunity in supermarkets, as most of them preffered it showing positive ranks in Wilcoxon rank test. Hence it proves the least reliability of lean principles in kirana stores than in supemarkets.Kirana stores usually have a pattern of replacing products, which is said to be done effectively manually. But a one time investment in kirana stores would hold the stores during seasonal heavy sales, and help avoid running out of stock.

VII.CONCLUSION AND RESULTS

In this study of understanding the reliability of lean operations in kirana stores and supermarkets, its found that supermarkets has more opportunity in this aspect. Due to various limitations of kirana stores, it is found to have least preference. Supermarkets could definitely reduce wastage by implementing market basket analysis, electronic

detectors in product replacement, and by FIFO method of product shelving. This would fuel profit maximisation, rectifying all flaws regarding product management and flow. Kirana stores would have scope onlean operations in future when there is good profit out of business. Mostly kirana stores are devoid of making huge investment, but keeps focusing on profit maximisation due to the outbreak of online easy shopping. Among the samples taken supermarkets score in their willingness to lean approach than kirana stores, which shows positive ranks in the rank test. The limitation of this study is that it is pure qualitative study, wherein quantiaive study gives more facts, and data could speak more about the implementation of lean in kirana and supermarkets.

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