

## Warehousing & Distribution Management of Online Grocery Stores

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### Abstract

*In view of current market scenario, the online companies are in constant pressure to increase and maintain their market share by satisfying customers in terms of completing the order and timely delivery of products. The role of distribution has become more significant in determining the order size, lead time and satisfying customer requirements. This case describes the lean logistic and customer satisfaction of largest customer online food and grocery store of India. The primary objective is to understand and improve the distribution and customer satisfaction using lean logistic system. For which a sample was chosen who were registered customers of Online food store. Statistical techniques have been used to estimate the relationship between customer satisfaction and various dimensions of logistics lean system on collected responses and obtained results are quite significant in explaining the above proposition.*

**Keywords:** Lean Logistic System, Warehouse, Distribution, Customer Satisfaction

### 1. Introduction

In today's competitive market scenario, to compete and survive in the market, the enterprises are adopting new tools and techniques to produce goods to improve cost efficiencies and customer satisfaction. Getting the right product/service, at the right price, at the right time to the customer is vital to competitive success and survival. Customer Satisfaction is a measure of how a product or service meet or exceed the expectation of the customer. Nowadays, every customer services transaction, be it online, telephonic or In-store services, ends with the feedback, as this is one single factor, which can help to retain the customer and improve loyalty. Customer satisfaction for Distribution companies will depend upon various factors. First important dimension is that distribution companies need to understand the customer requirement in terms of turnaroundtime. There may be some customers who may be willing to wait for the product delivery for a week and at the same time, there might be some customers who may ask for the delivery within 30 Minutes. Therefore, the company has to plan right "Customer Service Levels". Once the service level has been decided, all other resources need to be planned to meet the expected service level, to maintain or improve the customer satisfaction. Another factor, which plays a significant role, is location of warehouses and distribution centres. Transportation and courier services are another factor, which acts as an important parameter as it affects the customer satisfaction as well as bottom line of the company. The right balance between the type of transportation and the cost is very critical for the success of a distribution company.

At the present time, the competition is not limited to enterprise versus enterprise rather the competition is even supply chain versus supply chain and distribution network versus distribution network of competing enterprises that how to deliver products quickly at low cost and in good quality. The role of Distribution has become more significant in the company's performance given that product life cycle has shortened, variation in customer demand has increased and distribution is not limited to geographical boundaries but addresses global markets. Groceries has become an essential component of human life for meeting and running day to day activities. Over the years, online grocery shopping has become a rapidly growing business area especially in India. For most people shopping in supermarkets has become time consuming and boring task. Buying grocery online enables humans save greater time and exploration process become easier. This paper is based on online grocery stores in India. This sector is experiencing a high pressure to improve its customer response time. Since lean thinking intends to eliminate or reduce waste, the concept of Lean can be used fortimely distribution of the products or

services to the customers in cost effective manner. The distribution process of an enterprise comprises of many activities and sub processes. There might be waste (some activities that do not add value, in terms of time, material or efforts). The lean concept can be used to improve the entire distribution process. Moreover, insight regarding the waste elimination and proper warehousing and distribution management to gain customer satisfaction has been the focus areas.

## 2. Literature Review

Lean Management is a technique, which was pioneered by Toyota production system and is extended to distribution operations (Ohno, 1988). Lean thinking lays out the five lean manufacturing principals that are value, value stream, flow, pull, perfection (Womack and Jones, 1996). Towill (1996) recommended that waste in terms of cycle time from customer order to completion of order could be eliminated by removing unnecessary processes, eliminate time within processes, integrate the similar kind of processes, or do some processes parallel. Once the waste has been removed, the next step is to create the flow such that all the productive steps are in perfect sequence and the product or service move smoothly towards the customer. As the flow improves, the time to deliver the product or service reduces dramatically. Therefore, the product /service can be moved towards customer easily as and when needed and meeting with customer satisfaction and win order in the market (Naylor et al. 1999). The lean approach begins with understanding the value from the end customer perspective. It develops value stream and identifies the various steps involved in it and then removes the steps that doesn't add value called waste (Rother & Shook 1999). Lean implementation in SCM brings out improved results in terms of Inventory turns and Day Sale outstanding which directly reflects the customer satisfaction. The attributes like demand management, cost and Waste reduction, process standardisation, Industry standardisation, Cultural Change and Cross Enterprise Collaboration as key lean practices (Manrodt et al., 2008).

Lean was achieved in production system using various techniques like Just-in-Time (JIT), TQM, redesigning workstations etc. (Wilson, 2009). Lean is not a static process, rather it is a continuous process, it should become a part of corporate culture, and every employee should work towards implementing lean. Seven forms of waste define the lean process: overproduction, waiting, over processing, excess movement, excess transport, inventory, defects (Poppendieck, 2002) can be extended to lean distribution process (Hines et al. 2004). Lean distribution refers to a systematic approach which can be applied to all distribution functions and aims at minimizing waste at distribution centres in terms of time, material and efforts and maximizing the customer service level without sacrificing the quality (Kiff, 2000; Wang 2008; Jaca et al., 2012). Ugochukwu et al. (2012) discussed that how lean management can be extended from production environment to entire supply chain management and identified the lean practices like sourcing customer needs, waste elimination etc in supply chain by using lean tools and techniques like reducing waste from transport, waste from keeping high inventories and standardisation tools like setting maximum and minimum inventories limits. Another study done by Mahfouz & Arisha (2013) brings out that understanding customer needs and preferences, Buffer management and replenishment strategies are the key dimensions of the lean distribution. According to Singh et al. (2015) the customer can pull the product or service as and when needed. This leads to reduction in inventories and cost as in Just in Time (JIT). Once the customer value is identified, value stream is mapped, flow is created and pull has been established, the process is started again and continued till its perfection is achieved. Lean Distribution Company must implement effective warehousing and transportation as it plays a critical role in improving customer satisfaction (Muraira, et al. 2015). Each of the studies have common finding that lean practices in distribution removes waste and improves customer satisfaction. The basis of this article is to develop the understanding towards various parameters that impact customer satisfaction.

### 3. Warehousing and Distribution Model of Online Grocery Stores (OGS) in India

In today's scenario where mostly both the partners are working, there is no time to bear the burden of unavoidable shopping groceries by roaming shop to shop. Everyone needs an easy, comfortable and budget satisfying option. Online grocery sites are the best option that helps you in more ways than one

– saves your time, energy and money. In addition, you can get great deals time to time. Some of the best online grocery sites in India are: BigBasket, Grofers, Zopnow, Nature’s Basket, Reliance Fresh, Amazon Pantry, Aaramshop, Bazaar Cart, Naturally Yours. Some of the leading ones are:

- i. **BigBasket:** It is the largest selling online grocery site in India. Karnataka government tied up with BigBasket to promote the organic farming. BigBasket will procure approximately 500 metric tons of millets valued at Rs 2.50 crore. You can get quality and fresh vegetables, fruits, beverages, personal care products, household items, meat and eggs, bread, grocery and staples. Also, all the good quality products related to your grocery need such as rice, dairy, spices, gourmet products or any other items. Savings always be the priority of a customer; OGS is the place for online grocery in India where through various discounts and offers you can save on grocery items.
- ii. **Grofers:** Another Indian online grocery service provider is Grofers Gurugram based founded in December 2013. To order grocery items, customer uses a mobile application. Employees of Grofers fulfil the demand of customers by collecting the items from nearby warehouses. Scheduling of delivery is according to the customers preference time of the day. Grofers currently operates in a major city across India: Delhi, Gurugram, Mumbai, Bengaluru, Kolkata, Noida, Pune, Ahmedabad, Surat, Chennai, Chandigarh, Agra, Hyderabad, Jaipur, Lucknow.
- iii. **Reliance Fresh:** First reliance fresh retail store started in 2006 and today Reliance operates 566 Reliance Fresh and Reliance Smart stores and sells over 200 metric tons of Fruits and over 300 metric tons of Vegetables every day. It is one of the India’s leading neighborhood retail chain with freshness & savings. Reliance Fresh follows the mantra of Fresh Hamesha, Available Hamesha and Savings Hamesha. Customers will get fresh fruits & veggies, dairy products, cereals, spices, personal care products and many more. Reliance Retail is directly linked with the large number of farmers and some small vendors. This relationship is proving beneficial for both the farmers and the company.
- iv. **Amazon Pantry:** Amazon Pantry, an online supermarket, is a service of amazon.com wherein customers can buy grocery and other household items. Like other online grocery shopping portals amazon pantry also delivers the ordered items next day to your doorstep. There are some delivery charges below the shopping of Rs. 599, it’s Rs 30 for Prime customers and Rs 59 for non-Prime customers. Currently, Amazon Pantry is present in all over states and cities of India.

After the review of vast literature several types of waste impacting the satisfaction are identified given in table-1.

**Table 1: Types of Waste in Lean Distribution (Source: Abushaikha et al. (2018))**

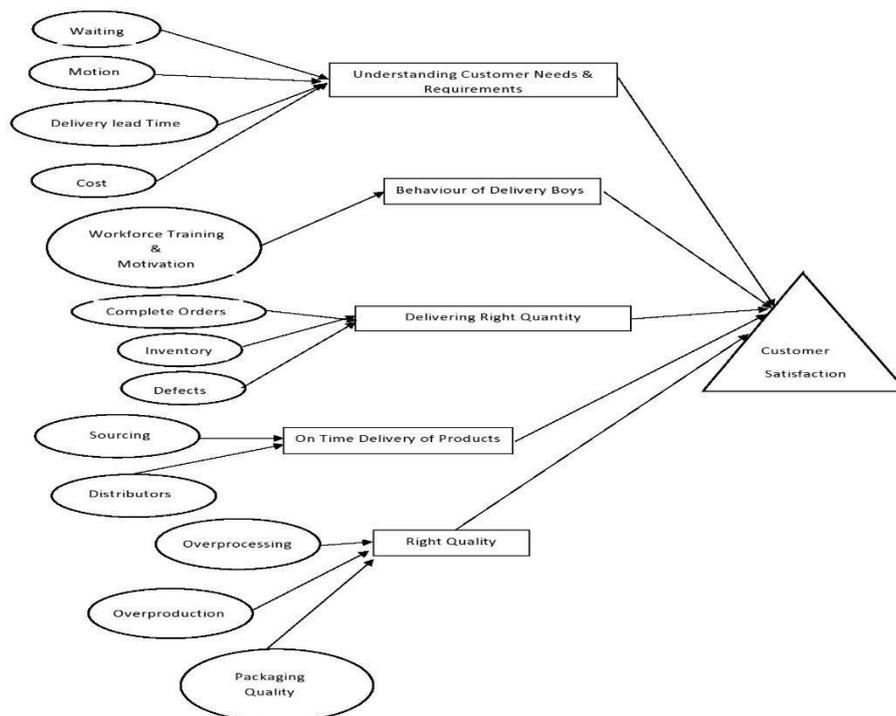
Waiting	This takes place whilst employees are equipped to hold their work, however the procedure does not permit them to, due to unavailability of merchandise, machines or the gadget. Further, it can be viewed in time period of waiting in the parking lot as truck drivers queue up on the identical time. Waiting might also cause underutilization of human beings and aid capacities.
Motion	This kind of waste arises when inventory isn't always stored at the best vicinity impacting the efficiency of workers as they have bend over to pick the objects. The opposite can be when goods are stores at uncomfortable heights which cannot be prevented due to constrain on storage space. Unnecessary moves in trying to find or locating goods.
Delivery lead time	The longer the time gap between the placement of order and their delivery are not desirable at customers end. Moreover, orders for grocery products are initiated on occurrence of their demands. Thus, their delays are not permissible.

Cost	The price of commodities can greatly influence the quantity within an order and the number of orders being placed. In regards to online platforms
	consumers have wider choices and exploration possibilities to look for best price they can choose from. Hence the understanding of the cost which can easily be afforded by consumers become quite significant. Also, the cost of commodities has a direct impact on the customer need and satisfaction.
Workforce training and motivation	Training and development possibilities must be seen visible as funding in development of essential human assets. Proper training of employees helps in attaining good customer satisfaction. It is the customer feedback which shapes the future of business.
Inventory	Overproduction leads to inventory into warehouse from factories. Accumulation of inventory symbolizes waste in supply chain as it reduces the space and workers productiveness.
Defects	The defects can amount to picking the wrong object or quantity which may result into over or under delivery of orders. This can amount to return of orders implying the recruitment of more personnel for handling such issues. Management of inventory and issues that may occur while goods are store in warehouse are also the factors accounting for waste.
Complete Orders	There can be many instances when goods are not delivered to customer in one go i.e. one single order is delivered in different parts which sometimes results into customer dissatisfaction. In order to ramp up the satisfaction goods should be delivered in one go.
Sourcing	Firms which can locate the most appropriate suppliers at the cheap cost that can help in maintaining a competitive advantage. Selection of suppliers should be as per the needs to eliminate unnecessary waste. Outsourcing in which firms contact a third-party supplier for delivering goods; sometimes these third-party suppliers are not working with the same aim as firms which may lead to delay in delivery.
Distributors	These are intermediators between the organization and customers which play the vital role in attaining customer satisfaction. Moreover, there cases when the distributors cancel order even their placement.
Over processing	Unnecessary re-entering of information several times and conducting quality check multiple times and movement of goods, etc., repeatedly leads to over processing.
Over production	Procuring goods before sending to customers and keeping them stored in warehouses and waiting for orders to be placed can be visualized as overproduction.
Packaging quality	Firms should look for options which are cheaper and are made of less wasteful materials at the same time it should be as per the stated standards so that goods do not get damaged in delivering process.

OGS started its operations using “Just-in-Time” model of distribution, wherein company purchased every item against the order. This was adopted not only for short shelf life products like Fruits/vegetable etc., but for all other grocery products also. In other words, the Model used was “Purchase to Order”. In this model, delivery person used to pick the item from nearby retailer after the customer order was received and used to deliver to the customer. This model is also called Drop ship Model in the case of BigBasket.

As the size of operation grew, the OGS distribution model started using Inventory Model also wherein they purchase most products directly from manufacturers like HUL, ITC, P&G etc. They created warehouses where these items are stocked. This model improved their margins as the retailers and wholesalers were by passed. Today OGS are procuring the material from manufacturers at national level. Some items are sourced directly from Mandis and farmers. OGS has implemented many Lean distribution strategies to its operations.

OGS has invested on “Understanding the customer needs and preferences” and adopted the models accordingly. At some places, OGS especially BigBasket is using Hyper local Strategy wherein it has tied up with more than 1800 neighbourhood grocery retailers so that product can be delivered to its customers within an hour, to meet the customer expectations. OGS has focused heavily on workforce training and motivation. In entire operations, “customer delight” has been the main focus for employees at each stage. Packaging plays an important part of the OGS’s operations especially for the short shelf life products like fruits, vegetables and dairy products. Some of the OGS has standardised the packaging quality so that products are delivered in the proper conditions to its customers.



**Figure 1: Impact of lean distribution waste on the attributes of customer satisfaction**

Figure 1 depicts several dimensions and their impact on attributes which can help in attaining satisfaction. For understanding customer needs and requirements there are factors like waiting, motion, delivery lead time and cost; whereas workforce training and motivation will have an influence on the behaviour of delivery boy. Aspects such as: inventory, defects and complete order effect the quantity to be delivered. The attribute ‘on time delivery of the products’ depend upon sourcing and distributors. Moreover, over processing, over production and packaging quality influences the quality level.

#### 4. Research Methodology

In order to understand the impact of warehousing and distribution management on customer satisfaction following objectives are considered:

1. To study the concept of lean management extended to warehousing and distribution processes.
2. To identify and review the various dimensions of lean distribution which affects the customer satisfaction.
3. To analyze various dimensions of lean distribution in improving customer satisfaction.

For carrying out the study, a sample of 100 respondents was chosen randomly who are users of OGS. The respondents are divided on the basis of age, gender, purchase frequency and product types purchased from OGS. For the data collection both primary and secondary sources are used. The primary data was collected by using a self-designed questionnaire. Secondary data has been collected using various journals, websites, books and articles printed in the magazines / newspapers etc.

#### 4.1. Analysis Tool

To find out the functional relationship between customer satisfaction and various dimensions of lean distribution, multiple linear regression analysis is the ideal choice. We have taken five dimensions of lean distribution, so these dimensions are regarded as five variables, which constitute five variable regression model. If  $y$  denotes the dependent variable i.e. customer satisfaction and  $x$  denotes the independent variables i.e. understanding customer needs & requirements, behavior of delivery boys, delivery right quantity, on time delivery of products, right quality, then the multiple linear regression equation can be framed as:

$$(1) \text{ where}$$

are regression coefficients.

#### 4.2. Hypothesis Testing

$H_0$ : There is no significant relationship between customer satisfaction and understanding customer needs & requirements, behavior of delivery boys, delivery right quantity, on time delivery of products, right quality.

#### 5. Data Analysis

For the analysis purpose a statistical software SPSS has been used. The following results are obtained.

**Table-2: Demographic Presentation**

Demographic Variable	Category	Frequency	Percentage %
Gender	Male	22	22
	Female	78	78
Age	Less than 20	10	10
	20-30	22	22
	31-40	25	25
	41-50	24	24
	Above 50	19	19
Education	High School	11	11
	Graduate	48	48
	Post Graduate & above	41	41
Monthly Income	Below 25000	09	09
	25000-50000	28	28
	50000-100000	31	31
	Above 100000	32	32

<b>Purchase Frequency</b>	Less than 5 Times	16	16
	6 to 10 Times	28	28
	11 Times or more	56	56
<b>Product Type</b>	Grocery Item	46	46
	Fruits, Vegetables or dairy products	36	36
	Both Grocery and Fruits, vegetables or dairy products	18	18

Table 2 shows that OGS has more female customers. Most of the buyers are in age group of 31-50 years. Most of buyer's monthly income is more than 50000. Customers purchase frequency is more than 11 and maximum purchase is for grocery items. The following results has attained after applying the multiple linear regression.

**Table-3: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.919 <sup>a</sup>	.845	.837	.237

The value of "R Square" and "Adjusted R Square" are almost similar which is satisfactory for the model fit. The adjusted R-square value 0.837 in the table shows that the dependent variable customer satisfaction is influenced 83.7% by the independent variables i.e. understanding customer needs & requirements, behavior of delivery boys, delivery right quantity, on time delivery of products, right quality.

**Table-4: Results of ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	28.770	5	5.754	102.629	.000
Residual	5.270	94	.056		
Total	34.040	99			

Table-4 concludes the fact that we do not have significant evidences to accept the null hypothesis which represents that the customer satisfaction is significantly related to understanding customer needs & requirements, behavior of delivery boys, delivery right quantity, on time delivery of products, right quality.

**Table-5: Regression Coefficient**

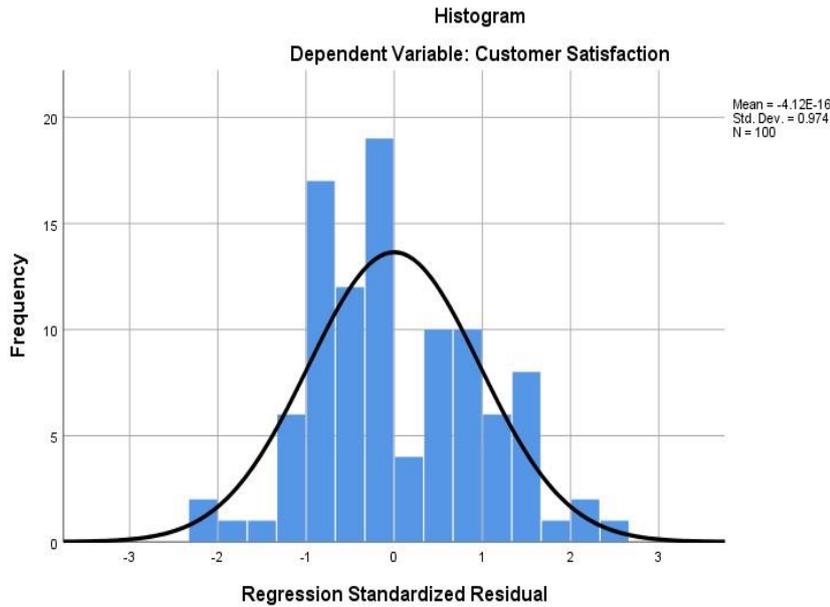
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
<b>(Constant)</b>	0.49	0.163		2.97	0		
<b>Understanding Customer Needs and Requirements</b>	0.08	0.037	0.113	2.04	0.05	0.538	1.86
<b>Behavior of Delivery Boys</b>	0.15	0.041	0.217	3.69	0	0.476	2.1
<b>Delivering Right Quantity</b>	0.19	0.039	0.228	4.72	0	0.706	1.42
<b>On time Delivery of Products</b>	0.23	0.046	0.312	4.91	0	0.408	2.45

<b>Right Quality</b>	0.2	0.044	0.275	4.49	0	0.439	2.28
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From Table 5, multiple regression equation can be deduced

(2)

Standardized coefficient data mentioned in equation 2 proves that the “on time delivery of products” is the most important factor for customer satisfaction. The next important factor is “right quality”. The third and fourth most important factors are Delivering Right Quantity and Behavior of delivery boys. Therefore, four factors are the main factors that are strongly influencing the customer satisfaction. The fifth factor has weak impact on customer satisfaction.



**Figure 2: Standardised Residual Error Normal Curve**

Figure 2 confirms that the regression model used for analysis of Fit as the standardized Residual (errors) follow a reasonable Normal Curve.

## 6. Conclusion

The study shows that the concept of lean management can be effectively extended to warehousing and distribution processes. It is one of the strategies which can be used very effectively to improve customer satisfaction. The study brings out that there are five major dimensions of lean distribution that significantly affect the customer satisfaction. These are namely “understanding customer needs & requirements, behavior of delivery boys, delivery right quantity, on time delivery of products, right quality”. The study revealed that dimensions of lean distribution significantly affect the customer satisfaction. In addition, it brings out that “understanding customer needs and requirements” is the least important dimension whereas “on time delivery” which is the most critical dimension for customer satisfaction.

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