



Business Analytics Depend on Study of Business Opportunity for Third-Party Logistics in Semi-Urban Areas of India

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ABSTRACT: In business, Profit margin is the one which determines the success rate and makes the country to develops economically. For attaining this higher profit margin globally businessmen are implementing or adapting multiple business techniques. Among that, one of the predominant business techniques used for supply chain management is Third-Party Logistics or 3PL. The incorporation of 3PL will acutely increase the profit margin by reducing the cost of consigning and warehouse rent. Due to the increment of profit margin, businessmen are adapting 3PL to outsource the logistics operations. But 3PL is not successful in Indian semiurban area which is came to know by our survey on 3PL in semi urban areas of India. The foremost reason for the hesitancy of 3PL model in semi urban areas of India is due to the lack of awareness and the conservative mindset which stopping businessmen to take risk. Because of this reason, young generation entrepreneurs from the semi urban areas are also not ready to take risk in establishing innovative business techniques to improve their business and the hesitancy towards innovative and modern business techniques are affecting the profit margin of those businessmen, the country's economy and employment. To avoid this problem, we have made an analysis on third-party logistics using linear regression and Naïve Bayes Classifier. With the help of those analysis, we had predicted the profit gain of businessmen, if they avail 3PL service and also analysed and predicted which section of the already existing businessmen will avail the 3PL service through Naïve Bayes Classifier. by this business analysis, we made a conclusion on 3PL business opportunities in semi urban areas of India.

KEYWORDS: 3PL, Profit Percentage, Linear Regression, Naïve Bayes Classifier, Business Analysis, Semi Urban Areas of India

I. INTRODUCTION

Predominantly researchers in the field of business analytics domain are developing more about new business models and those to enhance profit margin of a business. The profit margin is the deciding factor whether a businessman is getting succeeded with higher outputs. The analytical department of the research analyses every nook and cranny of the business to decide whether by which process a business gets succeeded. For the explicit purpose of success, businessmen are implicating numerous business techniques for making a high profit margin.

What is Third-Party Logistics or 3PL?

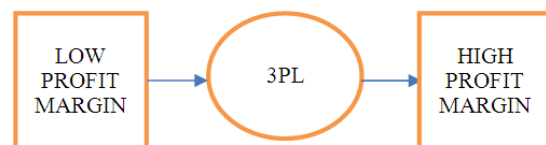
Third-Party Logistics or 3PL is a service that allows you to outsource operational logistics from warehousing, all the way through to delivery, and ultimately enables you to focus on other aspects of your business. Third-party Logistics companies provide n-number of services having to do with the logistics of a supply chain. This includes transportation, warehousing, picking and packing, inventory forecasting, order fulfillment, packaging and freight forwarding.

Benefit of 3PL:

- 1, Drive cost savings
- 2, Get access to expertise and experience
- 3, Focus on core competencies
- 4, Gain flexibility and scalability
- 5, Enable business growth and market

expansion

- 6, Improve customer satisfaction





That the 3pl will increase a business profit by decreasing a warehouse and logistics cost and due to this more businessmen in urban area of India were utilizing the 3pl and making their business to get growth at high level. In semiurban also the supply chain work is going well but the businessmen avoiding the new business techniques. Due to this avoidance the new business opportunities is not getting created in semi urban area of India and this is also one of the main reasons for the lag of economic development in semiurban areas of India.

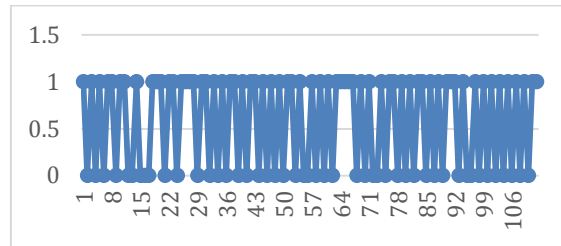
What Is the Exact Scenario of 3PL In Semi Urban Areas?

3PL is an outsourcing business element, especially in the operation field. The critical condition of Third-Party Logistics or 3PL in semi urban areas are that the business man not adopting these kind of innovative business techniques and they don't know that they can substantially earn a high profit margin and also this 3PL leads to the slower phase of economic development in semi urban areas. We came to this conclusion by analysing the samples which are all relevant to 3PL in semi urban areas of the Indian subcontinent. The main reason for low profit margin or loss of a business in semi urban area is that those businessmen in the region are lacking in knowledge about innovative business techniques or deliberately not implementing new business techniques because they're not ready to take risk to come out of their comfort zone and conservative mindset. Due to this, the implementation of new business techniques was not creating business opportunities in semi urban areas of India but there are several other ways to incorporate innovative business models in semi urban areas by using machine learning and data analytics as we discuss.

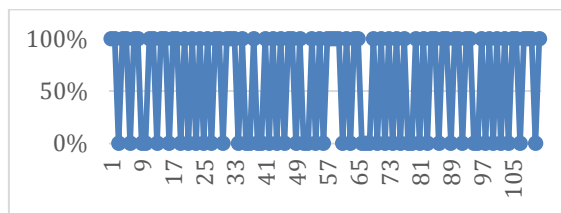
II. BUSINESS ANALYSIS

Frequency Distribution Table of Sampled Data:

SL.NO	CLASS	FREQUENCY
1	Owned Warehouse	65
2	Rented Warehouse	43
3	On Premises Warehouse	63
4	Off Premises Warehouse	50



Graph - II.I On Premises user frequency



Graph - II.II Off premises user frequency

III. FINANCIAL ANALYSIS

In this first part of financial analysis, we going to predict the profit percentage of a business man, when 3PL is not implemented by using linear regression equation in analysis software.

Linear regression equation, $Y = a + bx$

Y = dependent variable (sample mean profit percentage)

X = independent variable (sample mean cost of 3pl)

R code for predicting profit margin, when 3PL not implemented by using linear regression:

```
#The predictor vectors
```

```
x <- c(22,24,34,26,30,28,24,32,24,26)
```

```
# The response vector.
```

```
y <- c(50,55,50,58,57,52,54,56,60,52)
```

```
relation <- lm(y~x)
```

```
relation #intercept(-57.1393), slope(-1014)
```

```
# Find profit percentage of business with mean profit percentage of 34.
```

```
a <- data.frame(x = 34)
```

```
result <- predict (relation,a)
```

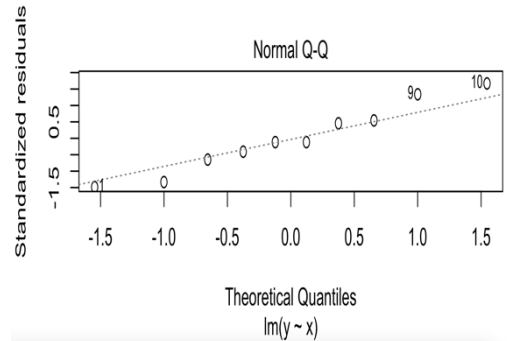
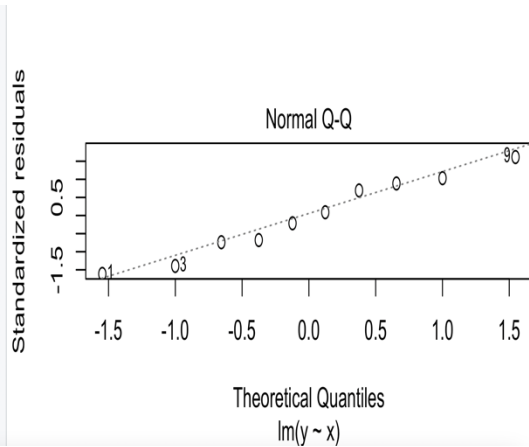
```
print(result)
```

```
output:
```

```
result=53.6898(the result value calculated by mean x value)
```

The result says that the 53.6898% of cost is taken from the net profit percentage of a business for payment of warehouse rent and logistics.

Exploratory Data Analysis (Not using 3PL):



In this second part of financial analysis, we going to predict the profit percentage of a business man, when 3PL is implemented by using linear regression equation in analysis software.

Linear regression equation, $Y = a + bx$

Y=dependent variable (sample mean profit percentage)

X=independent variable (sample mean cost of 3pl)

R code for predicting profit margin, when 3PL is implemented by using linear regression:

```
#The predictor vectors
x <- c(22,24,34,26,30,28,24,32,24,26)
# The response vector.
y <- c(30,35,40,38,37,32,34,36,40,42)
relation <- lm(y~x)
relation
# Find profit percentage of business with mean
profit percentage of 34.
a <- data.frame(x = 34)
result <- predict (relation,a)
print(result)
output:
```

result=38.7333(the result value calculated by mean x value)

The result says that the 38.7333% of cost is taken from the net profit percentage of a business, when 3PL is implemented.

Exploratory Data Analysis (After using 3PL):

Result:

In financial analysis, we discussed about two scenarios, when third-party logistics or 3PL were not implemented and when 3PL was implemented by using a linear regression equation. As a result of prediction estimation that the 16% of the loss in profit percentage used for logistics and warehouse rent can be recovered by the implementation of 3PL in the business which comes under supply chain management.

IV. MARKET ANALYSIS

In market analysis, we going to predict our target customer who will accept the 3PL and this prediction is done by Naïve bayes classifier.

Naïve bayes classifier:

$X = \{x_1, x_2, x_3, x_4\} \{y\}$

Independent variable:

x_1 = Warehouse owned

x_2 =Warehouse rented

x_3 =On Premises warehouse

x_4 =Off premises warehouse

Dependent variable:

y=whether they will accept 3PL

$$p(y|x_1, x_2, x_3, x_4) = p(x_1|y) * p(x_2|y) * p(x_3|y) * p(x_4|y) / p(x_1) * p(x_2) * p(x_3) * p(x_4)$$

$$= p(y) \pi_{i=1}^6 p(x_i|y) / p(x_1) * p(x_2) * p(x_3) * p(x_4)$$

$$Y = \arg \max_y p(y) \pi_{i=1}^6 (p_{x_i|y})$$

By applying a data in this equation, we can predict the target customer of 3PL.

Applying a Data for Predicting Target Customer:

Warehouse User

Warehouse User	Yes	NO	P(Y)	P(N)
Rented Warehouse	48	65	48/113	65/113
Owned Warehouse	65	48	65/113	48/113
Total	113	113	100%	100%



Warehouse premises

Situation-1: Predicting the business person who will accept 3PL, when they are using a on premises rented warehouse:

Calculation for situation-1:

3PL (Rented, ON premises)

Category-1: YES

$P(\text{Yes} | 3\text{PL}) = P(\text{Rented Warehouse} | \text{yes}) \times P(\text{Warehouse on Premises} | \text{yes}) \div P(3\text{PL}) = 0.491$

Category-2: NO

$P(\text{No} | 3\text{PL}) = P(\text{Rented Warehouse} | \text{No}) \times P(\text{Warehouse on Premises} | \text{No}) \div P(3\text{PL}) = 0.508$

Result for situation-1:

As per the result that the rented user who using on premises has a Naïve Bayes values high on No condition. So, we can predict that the user using on premises rented will have low chances to accept 3PL.

Situation-2: Predicting the business person who will accept 3PL, when they are using a off premises rented warehouse:

Calculation for situation-2:

3PL (Rented, OFF premises)

Category-1: YES

$P(\text{Yes} | 3\text{PL}) = P(\text{Rented Warehouse} | \text{yes}) \times P(\text{Warehouse off Premises} | \text{yes}) \div P(3\text{PL}) = 0.564$

Category-2: NO

$P(\text{No} | 3\text{PL}) = P(\text{Rented Warehouse} | \text{No}) \times P(\text{Warehouse off Premises} | \text{No}) \div P(3\text{PL}) = 0.435$

Result for situation-1:

As per the result that the rented user who using off premises has a Naïve Bayes values high on Yes condition. So, we can predict that the user using off premises rented will have a chance to accept 3PL.

Result:

In Market analysis, we discussed about two situation, That which category of businessmen will accept a 3PL and predicted that the businessmen who using off premises rented warehouse has a high chance to implement a 3PL. So, the businessmen who plans to start a business on 3PL want to approach off premises warehouse user and this is proved by Naïve Bayes classifier which show a greater value for Yes probability than No probability and also the businessmen who using on premises rented warehouse has a less chance to implement a 3pl in their business.

V. CONCLUSION

The implementation of third-party logistics or 3PL in semi urban areas of the Indian subcontinent will become successful, when the existing businessmen approaches an off Premises rented warehouse and

this was determined by the Naïve Bayes classifier and this would also result in an increase of profit

Warehouse Premises	Yes	No	P(y)	P(N)
Warehouse on Premises	40	73	40/113	73/113
Ware house off Premises	73	40	70/113	43/113
Total	113	113	100%	100%

margin by 34% which is determined by Linear Regression.

This increase in profit margin leaves a positive impact on the development of the nation and creation of new jobs. To uphold this, we need to move along with the rest of the world and adapt new business techniques.

By this we had concluded that the current situation of 3PL is failure in the semi urban areas of the Indian subcontinent. Due to the conservative mindset of businessmen in semi urban areas which stops them to explore and learn new business techniques and opportunities. Therefore, those who want to create new third-party logistics opportunities in semi urban area of India needs to approach an already existing businessmen who utilises off premises rented warehouse to avail their facility because in our survey we had found that nearly 42% of our samples representing population are already using an off -premises warehouse at a high rent.

REFERENCES

- [1]. Gold, Stefan, Stefan Seuring, and Philip Beske. "Sustainable supply chain management and inter-organizational resources: a literature review." *Corporate social responsibility and environmental management* 17.4 (2010): 230-245.
- [2]. Aguezzoul, Aicha. "Third-party logistics selection problem: A literature review on criteria and methods." *Omega* 49 (2014): 69-78.
- [3]. Jayaram, Jayanth, and Keah-Choon Tan. "Supply chain integration with third-party logistics providers." *International Journal of Production Economics* 125.2 (2010): 262-271.
- [4]. Perotti, Sara, et al. "Green supply chain practices and company performance: the case of 3PLs in Italy." *International Journal of*



Physical Distribution & Logistics Management (2012).

- [5]. QIN, Li-gong, Ming-xian WANG, and Jian ZHANG. "Research on Building Bidirectional Logistics System of Urban and Rural Areas in Guilin [J]." *Commercial Research* 9 (2009).
- [6]. AnuradhaBhushan, Mrs. "3PLs (Third Party Logistics Providers) as a Supply Chain Strategy in Integrating the Distribution Network for Reaching the Unreachable Rural Consumer."
- [7]. DONG, Qian-li, Qiang GUO, and Hong JIANG. "Research into the Problems and Countermeasures for Third Party Logistics Development [J]." *Communication and TransportatiOn Systems Engineering and Information* 3 (2002).
- [8]. Janné, Mats. *Construction logistics solutions in urban areas*. Vol. 1806. Linköping University Electronic Press, 2018.