Key drivers for Adoption of Green Logistics by Organized Retail Sector in Bengaluru

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ABSTRACT

Of late both Retail and Logistics sectors have been witnessing organized players getting into the sector primarily influenced by the potential growth in business which is witnessing double digit growth. For retail and etail operation, Logistics is the core function which influences the way the business operates in this sector. More growth in business in the retail or etail sector involve more and more of Logistics operation which inturn affects the environment adversely due to Green House Gas(GHG) emissions. While the organized players are more concerned about the effectiveness and the commercial viability of the Logistics operation, they tend to ignore the adverse effects of Logistics operation on the environment. The contribution of Logistics Operation towards Green House Gas(GHG) emission is about 13 % and the Indian Government is committed to reduce the GHG emissions. Thus, it is imperative for the Organized Retail/Etail players to render the Logistics operation Greener and Sustainable. Organised retail sector need to adopt Green Logistics and this study aims to identify the most significant drivers which influence the quicker and complete adoption of Green Logistics by the Organized Retail players in Bengaluru. People responsible for the logistics operation in the retail organization opines that Government regulation and Cost of Green Logistics options are the prime drivers that would influence adoption of Green Logistics faster.

Keywords: Green Logistics, Drivers, Government Regulation, Sustainability, Green House Gas, Retail.

INTRODUCTION:

Logistics ensure that the right product is available at the right place when it is most needed. While logistics operational efficiency is measured in terms of optimised cost and speed of delivery, the adverse impact of Logistics on environment is often neglected. Green Logistics refer to transportation, storage and handling of goods in a most sustainable way with an objective to reduce the GHG emissions. Towards this, organizations should assess the contribution of GHG emissions by different modes of transport and then select the right mode of transport, which not only provide the best logistics solution but also reduce the energy consumption and emission of CO_2 equivalent to the environment. Retail and e-tail sectors are witnessing double digit growth year on year and are expected to grow at the rate of 20% next couple of years. Logistics plays an important role in rendering Retail and etail sector operationally more effective. E-tail players in order to score over one another, are resorting to faster delivery promises compromising many times on the viability of the logistics operation.

More and more such trips not only affect the viability of the logistics operation as such but also adversely affect the environment due to vehicle emission. Today global warming created by large emissions of GHG is a major environmental concern. Thus greening the logistics are inevitable as the logistics operation is projected to contribute double the GHG emissions over the next decade from the present level of 7-8 %. Government of India is committed to reduce Green House Gas(GHG) emission despite projecting 7-8 % of economic growth in the coming years. As the concerns for environment is rapidly growing, Indian logistics players and users should respond to this call to reduce carbon footprints. Sustainability efforts is demanded from both logistics service providers and the users namely retail and e-tail sectors in order to reduce and achieve the target set by the government of India with regard to GHG emission from India.

World over, the contribution of Logistics operation is about 11 % of total Co2 equivalent emission and it is one of the major contributor of GHG emissions to the environment. Green Logistics aims to provide environmentally friendly solutions for the retail sector ensuring efficient logistics operation. Retail organizations need to have sustainability goals along with their other business objectives.

LITERATURE REVIEW:

The market share of organised retail sector is about 16-18 % and is experiencing exponential growth and it is projected to reach 30% market share by 2030. (Economic Times, 2012). According to study by Economists Intelligence Unit 2008, sustainability efforts does contribute and enhances the ability to attract new customers and retain the existing customers. It has improved shareholders value, increased profitability, better quality products and processes. According to the study by United Nations Global Compact, (UNGC, 2010), the factors driving the sustainability efforts by organizations are the Brand reputation, cost reduction, personal motivation, employee satisfaction and government regulation risk. Drivers for retail sector according to the report by (WWF, India, 2014) are the cost reduction, retailers enhancing their reputation, regulatory pressure in some countries and risk mitigation. Sustainability initiatives are not reported or mandatorily disclosed by retail organization which makes it difficult to assess the efforts made by the organization towards sustainability.

Sustainable or Green Logistics operation aims to achieve lower emission of GHG through minimum movement and transportation of goods, minimum handling and optimum utilization of vehicles. Strategy include network design, optimization of routes, hybrid fuel technology, modal shift and green transport procurement are some of the strategic level concepts for green logistics according to the study by D R Ratnajeeva and J M S S Bandara(2015). Although vehicle manufacturers are constantly developing new vehicles with lower emission levels with greener technologies, but it has failed to catch up with the growing volume of logistics requirements (Aronsson & Brodin, 2006).

According to Dakshina Murthy & Leena James(2014) only 14 % of the organised retail sector were aware and have initiated few measures towards environmental friendly logistic activities. According to Pual R Murphy et al, (2003), the demand for sustainable logistics would lead to broadening the scope for Logistics and this will have a greater influencing factor for strategy with regard to Logistics. Also road freight transportation is a major contributor to carbon dioxide equivalent emissions.

According Minanham (1997), Toyota is part of a continuous improvement process and Just In Time supply system. The location of the supplier base contributes to a distribution network in a closed loop, known as "Milkrun" and the suppliers thus can offer parts for assembly based on JIT principles. Therefore, from the point of view of transportation, location of suppliers is a critical factor for efficient JIT with a dual objective of achieving optimization of the transport streams and minimization of inventory. In Japan, Nissan with its factories more dispersed than Toyota, adding buffer stock, well above the levels maintained by Toyota being the strategy practiced by Nissan to offset the congestion in urban areas. Therefore, from the point of view of transport and supply chain, it is important to identify the key strategic factors that enable high performance green logistics in a JIT system. Best route scheduling can be obtained by companies that emphasized with good integration with suppliers and leading logistics service providers.

Paxton(1994) indicated that the amount of distance traversed by a material or product to finally reach the user or end customer is known as food mile and higher the food miles, then higher the demand for logistics. It is prudent to have local sources thus reducing the food mile and logistics requirements thus contributing towards environment sustainability. Boge (1994), in the article "the well travelled yogurt pot" indicated that the requirement for logistics for ordinary day to day items are so high and demanding that it is adding significantly to the noise and pollution levels in the environment.

According to Corbet and Kleindorfer(2003) materials used and the processes employed should be clean and green. Bekele et al, (2012), in their studies enumerated that the logistics plays an important role in the

sustainability aspects of food retail.

According to Rutkowski, K(2009), orientation towards sustainable logistic solutions helps today's logistic players to increase their market share, build customer's loyalty, positively distinguish their service offerings, improve employees morale and loyalty and at the same time enhancing the effectiveness and productivity of the entire supply chain. The logistics solution should serve the three prime objectives, namely the economic success, social responsibility and the environmental sustainability. Freight transport contribute around 8 % of CO_2 emissions and in that road transport accounted for 92 % according to McKinnon, A and Piecyk, M (2009).

As per the report by Supply Chain & Logistics Association, Canada Research centre (2009), retail sector in Canada monitor the GHG emissions in all their activities and make continuous effort to reduce the same through DC pick optimization, load maximization, use of multi-modal transport solution and engaging environmentally more responsible logistics partners.

Tengku Nural et al (2015) study in Malaysia revealed that about 30 % of logistics players dealing with air, road and sea freight had set environmental objectives for themselves and set goals to reduce the effect of their services on the environment.

Generally, transportation is the major activity of most logistics services (Islam et al., 2013). Carbon emissions can be reduced through optimizing the design of a logistics network, adapting right modes of transportation and managing the right load and routes. According to Paxton(1994) higher the food mile, higher the demand for Logistics and reduction of quantity of logistics is key to sustainability. Minimising the distance travelled is a key step in network optimization(Sbihi and Eglese, 2007). Numerous factors drive enterprise to go for green logistics such as cost reduction and improvement in customer relationship (Fortes, 2009).

Barrier for implementing Green logistics are the high investment, lack of will and lack of infrastructure support from government.(Nagam El-Berishy, 2013). Green Logistics adoption may lead to trade-offs among responsiveness, cost & quality, delivery time and customer satisfaction(Wu & Dunn, 1995). Practicing Just in Time supplies increases the Logistics operation which inturn affects the environment.(Zhu, Sarkis and Yung, 2005).

RESEARCH METHODOLOGY:

For assessing the level of sustainability efforts initiated and practiced by various players in the organised retail sector in Bengaluru, structured questionnaire instrument employed. Population for this study is the organised retail companies in Bengaluru. Executives in charge of Logistics operation in the organised retail companies responded and the data collected subjected to statistical analysis. Respondents were asked to rank the ten factors which may have influence on the adoption of Green Logistics by Organized retail sector in Bengaluru and the top two factors with highest ranked value considered for the postulation of the hypothesis in favour of adoption of Green Logistics. Hypothesis framed for this purpose indicated below;

Hypothesis tested are:
1. H0: Government regulation is not a significant influencing factor for adoption of Green logistics by organized retail sector
2. H0: There is no significant relationship between the Cost and adoption of Green Logistics by organized retail sector

The above hypothesis is tested statistically using One sample Wilcoxon signed rank test.

RESULT AND DISCUSSION:

Organized retail sector is growing over the last couple of years in the Indian market and trying to establish themselves. Many corporate entities such as Reliance group, Adithya Birla Group, Future Group, Raheja Group, TATA's, RPG Group , etc., have made inroads into this sector and trying to edge out the un-organised retail outlets. Bengaluru is the fastest growing metropolis city that offers an ideal market place for the organised retail sector and is considered as the hub of retail revolution. Bengaluru being a cosmopolitan city, the consumer taste and behaviour as seen in the city closely represents the pan India pattern of consumer behaviour as the city hosts people with different region, background, culture, tradition etc. Organized retail companies who have established their brand and have business units in Bengaluru as well as in other Indian cities were approached for assessment of level of adoption of Green Logistics practices. The basic search of these organizations in terms of corporate policy with regard to environmental concerns, social responsibility etc. revealed the corporate culture and the environment protection strategies adopted by these organizations and it is summarized below;

Future group as part of their sustainability efforts have integrated sustainable development into their business

activities and are promoting sustainable economic development. Through innovations and investments, the group aims to embrace practices that promote greener ways of doing business and are fully conscious about the impact of their business activities on the surroundings and the environment. The group have taken certain environmental sustainable initiatives such as optimize energy consumption in its stores, promoting green products and using packages that are environmentally friendly and reinforcing environmental considerations in Logistics.

The Chief Sustainability Officer of Aditya Birla Group(ABG) engaging in retail business states that there are directions to manage the operations in the most sustainable manner through better water, energy and waste management and developing strategic business plans that will embed sustainability trends. The group has framed policies for various aspects of business such as transportation policy in which it states that the group shall endeavour to minimize the environmental impacts in ABG transport fleet and logistics services. Their Supply chain and procurement policy directs their suppliers to adopt the ABG sustainability framework policies and standards. The groups environmental policy calls for monitoring, measuring and reporting the progress and performance of environmental management initiatives. Efficient use of energy resources and reducing carbon footprint in operation activities are some of the initiatives which are driving the group in an effort towards sustainability.

Plastic packaging materials are not used at most of the reliance retail outlets and the corporate policy drives the company to reduce the environmental impacts. Many other corporate groups have put in place the intentions towards sustainability in the form of statements or policy and are yet to fully implement the same in letter at the ground level.

Factors influencing the adoption of Green Logistics:
The respondents were asked to rank the factors which are likely to influences the adoption of Green Logistics on a scale of 1 to 10 where rank 1 indicates factor having the least influence and rank 10 indicating factor having higher influence on adoption of Green Logistics. In the Table : 1, Ranking of factors influencing the adoption of green Logistics is summarised;

Table 1: Relative importance of factors as perceived by the respondents with respect to adoption of green logistics

	Weighted average score	Relative Importance (in Ranks)
Government policies and Regulations	8.67	1
Cost of Green Logistics solution	7.76	2
Impact of Logistics operations on environment	7.19	3
Top Management support and Commitment	7.00	4
Awareness about Green Logistics and its benefits for sustainable operations	6.43	5
Availability of Green Logistics services	6.38	6
Assume Leadership in sustainability	6.29	7
Part of Corporate Social Responsibility agenda	6.10	8
Gaining competitive advantage and differentiation among competitors	5.95	9
Improving Public image and customer perception about the company	5.95	10

Based on highly influencing factors for adoption of Green Logistics, the first two top most factors were considered for deriving the hypothesis and the two hypothesis tested statistically for assessing the effect of these two factors on the successful and complete adoption of Green Logistics by organized Retail players.

Test of Hypothesis:
Hypothesis # 1:
H0: Government regulation is not a significant influencing factor for adoption of Green logistics by organized retail sector.
The above hypothesis is tested using One sample Wilcoxon signed rank test.
The responses are captured with 1 – "Strongly Disagree", 2- Disagree, 3- Neutral, 4 – Agree and
5 – "Strongly Agree"
The null hypothesis is that there is no change ("neutral") in the rating given by the respondents and so the hypothesized sign rank is 3.
Now, the null and alternative hypotheses can be stated as follows.

H0: Mean response is equal to 3 [sign = 0]
[Indicates that higher proportion of respondents are remaining neutral to the above statement]
H1: Mean response is less than 3 [sign is negative]
[Indicates that higher proportion of respondents are "Strongly Disagree and Disagree" to the above statement]
H1: Mean response is greater than 3 [sign is positive]
[Indicates that higher proportion of respondents are "Strongly Agree and Agree" to the above statement]

Table 2a: Frequency Distribution

	No. of respondents
Strongly agree (5)	79
Agree (4)	43
Neutral (3)	3
Disagree (2)	0
Strongly Disagree (1)	0
Total	**125**

Table 2b: One sample Wilcoxon signed rank test result

```
Wilcoxon signed-rank test

        sign |      obs    sum ranks    expected

    positive |      122        7869      3934.5
    negative |        0           0      3934.5
        zero |        3           6           6

         all |      125        7875        7875

unadjusted variance    164718.75
adjustment for ties    -11925.50
adjustment for zeros       -3.50
                       _____

adjusted variance      152789.75

Ho: var3 = 3
            z =   10.066
    Prob > |z| =   0.0000
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From the above one sample Wilcoxon Signed Rank test result (see table 2b), it is observed that the p-value (0.000) is less than the significant at 5 percent level. Hence, the null hypothesis (H0) that a higher proportion of respondents remaining neutral to the above statement is rejected. Before accepting any one among the two alternative hypotheses, we need to observe the one sample Wilcoxon Signed Rank test result (see table 2b). Accordingly, there are a higher (122) number respondents with a positive sign as compared to number of respondents with a negative sign [zero respondents]. Now, as both "Agree" and "Strongly Agree" has been given a scaling of 4 & 5, the positive sign indicate that the respondents are towards agreeing to the statement that Government regulation is a significant influencing factor for adoption of Green logistics by the organized retail sector. On the contrary, the negative sign indicate that respondents have ranked towards "Disagree" and "Strongly Disagree" to the above statement.

Hypothesis # 2:
H0: There is no significant relationship between Cost and adoption of Green Logistics practices by organized retail sector
The above hypothesis is tested using One sample Wilcoxon signed rank test.
The responses are captured with 1 – "Strongly Disagree", 2- Disagree, 3- Neutral, 4 – Agree and
5 – "Strongly Agree"
The null hypothesis is that there is no change ("neutral") in the rating given by the respondents and so the hypothesized sign rank is 3.

Now, the null and alternative hypotheses can be stated as follows.
H0: Mean response is equal to 3 [sign = 0]
[Indicates that higher proportion of respondents are remaining neutral to the above statement]
H1: Mean response is less than 3 [sign is negative]
[Indicates that higher proportion of respondents are "Strongly Disagree and Disagree" to the above statement]
H1: Mean response is greater than 3 [sign is positive]
[Indicates that higher proportion of respondents are "Strongly Agree and Agree" to the above statement]

Table 3a: Frequency Distribution

	No. of respondents
Strongly agree (5)	44
Agree (4)	60
Neutral (3)	20
Disagree (2)	1
Strongly Disagree (1)	0
Total	**125**

Table 3b: One sample Wilcoxon signed rank test result

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Wilcoxon signed-rank test

        sign |      obs    sum ranks    expected

    positive |      104        7614      3832.5
    negative |        1          51      3832.5
        zero |       20         210         210

         all |      125        7875        7875

unadjusted variance     164718.75
adjustment for ties      -6501.25
adjustment for zeros      -717.50
                        _____
adjusted variance       157500.00

Ho: var2 = 3
             z =     9.528
   Prob > |z| =     0.0000
```

From the above one sample Wilcoxon signed rank test result (see table 3b), it is observed that the p-value (0.001) is less than the significant at 5 percent level. Hence, the null hypothesis (H0) that a higher proportion of respondents remaining neutral to the above statement is rejected. Before accepting any one among the two alternative hypotheses, we need to observe the one sample Wilcoxon Signed Rank test result (see table 3b). Accordingly, there are a higher (104) number respondents with a positive sign as compared to number of respondents with a negative sign [one respondent]. Now, as both "Agree" and "Strongly Agree" has been given a scaling of 4 & 5 respectively, the positive sign indicate the respondents are towards agreeing to the statement that higher the cost, lower the adoption of Green logistics practices by organized retail sector. On the contrary, the negative sign indicate that respondents have ranked towards "Disagree" and "Strongly Disagree" to the above statement.

CONCLUSION:

1. Organized retail industry is witnessing double digit growth and is projected to reach 30 % Market share by 2030. The backbone of Retail operation is the Logistics services which adversely impact environment due to GHG emissions. Greening the Logistics services is inevitable.
2. Based on the respondents ranking, the two most influential factors for successful and quick adoption of Green Logistics are the Government rules and regulations and the cost of green logistics. Hence, two hypothesis

were framed based on the two prime factors having significant influence on the adoption of Green Logistics by organized retail players.

3. Based on the statistical analysis of the data, the Null hypothesis which is, the Government Regulations have no significant influence on the adoption of Green Logistics by organized retail players, has been rejected and the respondents feel that the Government regulations have significant influence regarding the adoption of Green Logistics by the organized retail players. Government must formulate and impose strict rules and regulations in the Logistics sphere to ensure lower emissions of GHG to the environment.

4. The research and the statistical analysis indicated strong inverse relationship between the cost of Logistics and the adoption of Green Logistics. Higher the cost of Green Logistics, lower is the adoption of Green Logistics. As the organized retail players still judge the efficacy of the Logistics operations in terms of cost of logistics operation neglecting its adverse impact on environment, it should be made clear to the retail players that the adverse impact on environment is irreversible and this has a major bearing on the social cost and this aspect cannot be compared with the commercial success of the Logistics alone.

5. Though big players in the organized retail sector have put in place the environment sustainability policy and have initiated certain measures towards sustainability, but the adoption of Green Logistics is still in the nascent stage and it requires total commitment from the top management to ensure its full adoption.

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