

## A Review of Research on Green Logistics Distribution Practices

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**Abstract**— Due to increased focus on environmental pollution through transport activities, organizations, transport providers and governments have taken various initiatives towards reducing the environmental impact of transport and logistics related activities. Hence vehicles have become more environmental friendly than in the past but environmental measures have failed to keep pace with growing transport volumes. Therefore an expansion of avenues to reduce the environmental effect is necessary. The concept of green logistics is a part of reducing the environmental impact of organisations. Therefore it is important to identify the green logistics distribution practices taken into consideration by researchers. Also the effectiveness of these practices and issues/barriers in implementation should be identified. It is only then that further research can be undertaken to give solutions and focus on new research avenues. This research focuses on, what aspects have research on green logistics distribution practices been conducted with the objectives of identifying the green logistics distribution practices researched on, their effectiveness and issues/barriers related. This research was conducted as a content analysis. A total of thirty research papers were considered as a limited amount of research is found which specifically focuses on green logistics distribution practices. The keywords 'Green logistics distribution practices' was used to select the suitable research articles through the internet database. A critical analysis of the papers was done to identify the state of research on green logistics distribution practices. The findings suggest that environmental friendly logistics structures are characterised by fewer movements, less handling, shorter transportation distances, more direct shipping routes and better utilisation of vehicles. Strategies related to modal shift, hybrid fuel technology, optimisation of routes, proper network design, reverse logistics and green transport procurement have been identified as effective strategies. Barriers have been mainly identified for electric vehicles including the cost of using such vehicles, the purchasing of them and operational problems.

**Keywords**—Green logistics, Distribution practices, Environment

### I. INTRODUCTION

The different methods of environmental pollution include transportation, manufacturing and energy

generation. Out of these activities, it is widely recognised that logistics and transport operations have a large negative impact on the natural environment (Martinsen, 2011). Further (Aronsson & Brodin, 2006) states that transportation is one of the major sources of environmental problems and it is expected to increase even faster than the general growth of GNP in the industrialized world. Transportation activities mainly contribute towards environmental issues through air pollution and noise (Aronsson & Brodin, 2006). Due to the increased focus on environmental pollution through transport activities, organisations, transport service providers and governments have taken various initiatives towards reducing the environmental impact of transport and logistics related activities. As a result of that through numerous measures vehicles have become more environmental friendly than they were in the past but environmental measures have failed to keep pace with growing transport volumes (Aronsson & Brodin, 2006). This indicates that it is insufficient to consider merely measures to make vehicles more environment friendly and that an expansion of avenues to reduce the environmental effect is necessary. The concern about the environmental destruction caused by different activities has increased in recent years and transport and logistics activities are major contributors to it. Different means have been taken to mitigate this negative effect. The concept of moving into green logistics is a part of reducing the environmental impact of organisations. Green logistics refers to "attempts to measure and minimize the ecological impact of logistics activities".

Therefore it is important to identify the green logistics distribution practices with have been taken into consideration by researchers. Also the effectiveness of these practices and the issues/barriers faced in implementation should be identified. It is only then that further research can be undertaken to given solutions to those problems and to think of new research avenues.

This study has focused on the research question 'on what aspects have research on green logistics distribution practices been conducted' with objectives to identify the green logistics distribution practices have been researched on, to identify the effectiveness of the practices and to identify the issues and barriers related to the practices.

## II. METHODOLOGY AND EXPERIMENTAL DESIGN

### A. Literature Review

A number of researches have been conducted previously in similar nature in different areas to identify the research status and to find new avenues of research. Fettke et al (2010) has conducted a research to analyse on Business Process Management research. Similarly Dwivedi and Mustafee (2009) has conducted a literature review in their research 'Profiling research published in the Journal of Enterprise Information Management', Soni and Kodali (2011) on research content in supply chain management, Craighead et al (2007) on the evolution of logistics research, Yoo et al (2007) on published marketing research, Bisman and Liao (2009) on accounting literature in China, Liao-Troth et al (2012) on research in the International Journal of Logistics Management and Pallis et al (2010) about research on port economics, policy and management.

When considering research of similar nature related to green logistics distribution, (Hickford & Cherrett, 2007) have conducted a literature review on research about reverse logistics, with emphasis on green logistics and city logistics, where they have found that there is a lack of research on reverse logistics specific to the urban context. A literature review on transport management has been conducted by the Heriot-Watt University related to transport optimization, vehicle utilisation and green transport management measures in freight transport. (Transport Management- A literature review, 2007). As the findings it is stated that environmental concerns will increasingly affect the role of transport management. But the limitation here is that it is considering only road transportation and also that it has been done eight years ago. As the industry is dynamic the changes thereafter haven't been considered in any study. Another research gap is that only a single mode of transport has been considered in the previous studies. Therefore this study will focus on land transportation and considers recent studies. Overall it can be stated that reviews of research has been conducted in various fields in order to assess the research state, identify research gaps and suggest future research needs.

The research method used by almost all of the previous research is content analysis. A critical assessment of the research articles is conducted to achieve the research objectives. Marri (2007) states about content analysis in the following manner "Content analysis, a standard methodology in the social sciences, describes and classifies communication and content". Further it is it offers a broad definition of content analysis as "any technique for making inferences by objectively and systematically identifying specified characteristics of messages." Content analysis enables the researcher to

analyse large amounts of textual information and systematically categorize its properties according to a certain theoretical framework (Marri 2007). Therefore content analysis is a common methodology used in many researches of this nature.

### B. Methodology

As discussed in the literature review content analysis is the most suitable method for this type of research. Therefore this research was conducted as a content analysis. A total of thirty research papers were taken into consideration as a limited amount of research is found which specifically focuses on green logistics distribution practices. The keywords 'Green logistics distribution practices' was used to select the suitable research articles through the internet database. A critical analysis of the papers was done to identify the state of research on green logistics distribution practices. Thereafter to identify the green logistics distribution practices have been researched on, the effectiveness of the practices and identify the issues and barriers related to the practices.

## III. RESULTS

According to the analysis of the study, modal shift and the use of intermodal transport is a strategy discussed in research. Transport operations account for a large share of any logistics system's emissions (Wu and Dunn, 1995) and consequently, much of the recent logistics literature has focused on the sustainability of transport operations within the system. In a European context, a measure commonly suggested to reduce the environmental impact of transportation is the shift in transport modes, from faster, more polluting modes such as road and air transport to slower and less polluting modes such as rail or maritime transport (McKinnon, 2008; European Commission, 2001). In particular, intermodal road-rail solutions, where a combination of road and rail transport is utilized, has been suggested as a promising way to reduce the CO<sub>2</sub> emissions from the transport operations within a logistics system (Flode'n, 2007; Swedish Government, 2006; European Commission, 2001). A recent study focused on assessing how CO<sub>2</sub> emissions changed owing to a change from uni-modal truck transport to intermodal road-rail transport on 19 European routes (IFEU and SGKV, 2009). The researchers have argued that for these 19 routes, CO<sub>2</sub> emissions decreased by 20-50 percent due to the modal shift.

Under environmental process design practices, it is stated that, modal shift referring to the changes of transport modes from less environmentally friendly ones to more environmentally friendly ones could generate positive impacts on the global environment. Tesco, for example, utilizes rail instead of trucks between the Midlands and

central Scotland, which allows them to save more than seven million road kilometers and reduce 6,000 tons of CO<sub>2</sub> per annum (Woodburn and Whiteing, 2010). It is revealed that The European Commission (2001) has stated in their White paper (European transport policy for 2010), that logistics can contribute to the objectives of sustainable transport through contributing to mode shift (from road to other modes) (Aronsson & Brodin, 2006). Similarly switching of modes as well as instead of a complete switch from one mode to another, the possibility of using intermodal transports and further that intermodal transports can, if managed in an appropriate manner, contribute to decreased environmental impact (Martinsen U. , 2011). One of the programs implemented by UPS in their effort towards sustainability is leveraging multiple transportation modes to ensure a fuel-efficient delivery network (Dey, LaGuardia, & Srinivasan, 2011). The use of intermodal solutions to reduce road transportation is in agreement with the GL principles adopted by the Italian automobile manufacturer Fiat (Fiat 2010). It can be concluded that this strategy contributes greatly towards green logistics as depicted by several researches and because emissions are directly related to the mode of transport used. And its implementation has displayed that it is an effective strategy.

Another green logistics strategy discussed is the optimization of transportation dispatching and select transport routes rationally. This helps to avoid idle travelling, convection transport, circuitous transport and repetitive transport. On the other hand it improves vehicles' actual load rate and round-trip carrying rate effectively. This has been stated as a method to develop green logistics (Deng & Huang, 2011). Environmental friendly logistics structures are characterised by fewer movements, less handling, shorter transportation distances, more direct shipping routes and better utilisation.

Network design decisions which includes configuration of suppliers and distribution networks have been seen as inputs into the transportation decisions (Aronsson & Brodin, 2006). Distribution network design has been suggested by both Wu and Dunn (1995) McIntyre et al.(1998). Further it is stated that transport distances are although not frequently mentioned, perhaps the most direct driver of emissions from logistics systems. Therefore strategies which reduce the distance of travel will be effective.

Logistics system design is one of the main categories of green logistics and more direct transport and continuous improvement of distribution networks have been included under it (Martinsen U. , 2011). According to (Lau, 2011) network optimisation is one of the major

Green Logistics opportunities recommended by the global management consulting firm -Accenture. Routing systems to minimize travel distances is one of the main distribution and transportation strategies identified through the literature review on green supply chain practices (Perotti, Zorzini, Cagno, & Micheli, 2012). Therefore it can be concluded that this is a strategy which has been taken into consideration in several studies and which is suggested to be effective.

Another strategy discussed in research is optimization of transport capacity through consolidation and scheduling. (Aronsson & Brodin, 2006) mention freight consolidation as an important decision for the environmental performance of a logistics system. This aspect is central to logistics systems on many levels, as consolidation of freight concerns fleet size, vehicles, container and package sizes. Further in this study two organizations; 'FurniComp' and 'PaperComp' have consolidated flows which have resulted in reduction of emissions. It has been stated that emissions are primarily related to the number of kilometers trucks driven (vehicle-km) and to a lesser extent to the weight of the goods. In transportation, consolidation of orders and optimisation of schedules and routes decrease distribution frequency and cut fuel consumption (Lau, 2011). Therefore through reduction of fuel consumption resource usage is minimised and the emission production is reduced. The optimisation of transport capacity through consolidation and scheduling is in agreement with the Green Logistics principles adopted by the Italian automobile manufacturer Fiat (Fiat 2010). (Perotti, Zorzini, Cagno, & Micheli, 2012) state that the reduction of the number of trips by consolidating freight and balancing backhaul movements as one of the foremost initiatives towards environmentally-responsible logistics systems. Therefore it can be concluded that this strategy is widely focused on by research. Also it is an effective strategy which has been implemented by different organisations.

Higher vehicle utilization is a strategy that is connected with the two strategies discussed above. From an environmental perspective, under-utilization of vehicles causes greater emissions than the case in which full-utilization is achieved due to the additional trips being made (Aronsson & Brodin, 2006). Higher utilisation of vehicles will include the increase of average load on laden trips, decrease the average percentage of empty running, improve on backhaul management and result in high fill rates. Similarly, vehicle utilisation, energy efficiency and carbon intensity of fuel are main categories of green logistics discussed by (Martinsen U. , 2011). Therefore it can be concluded that this strategy has been focused on by several researchers and is suggested as an effective strategy.

Use of techniques and technologies such as: cruise control, reductions in left hand turns, GPS units, and automatic engine shut down devices have been discussed as green logistics strategies. Multiple firms have implemented creative solutions using less sophisticated techniques and technologies to reduce their dependency on fossil fuels which include cruise control, reductions in left hand turns, GPS units, and automatic engine shut down devices (Dey, LaGuardia, & Srinivasan, 2011). In the city of Osaka, a co-operative system using electric vans has been tested a few years back and the vehicles had been equipped with GPS, VICS (Vehicle information communication system) and the advanced systems helped the drivers to pick the optimum route and helped the organisations to monitor the position of vehicles (Geroliminis & Daganzo, 2005). Less research could be found on this, but practically companies such as FedEx have reduced the amount of left turns, while organizations use GPS to monitor the movement of vehicles. Therefore research conducted on this strategy is lacking behind.

The use of more fuel-efficient vehicles or alternative energy sources/hybrid fuel technology sources and increase the use of low emission and more environmental friendly vehicles is another strategy identified. Increased attention has been focused on clean vehicle technology through two important methods; improving the efficiency of vehicles in their day-to-day operations and switching to alternative or hybrid fuel technology sources. The adoption rates have been low for both bio-fuelled and battery powered vehicles, but these technologies are becoming increasingly viable and adoption rates are expected to rise in the near future (Dey, LaGuardia, & Srinivasan, 2011). One of the sustainability initiatives of UPS, a key player in the transport and logistics industry, has been to focus on its environment (UPS Study, 2010); launching new green products (carbon-neutral shipping) and use of alternative fuel delivery vehicles have been implemented by UPS. UPS has increased its fuel economy (measured in MPG) for its ground fleet by 10 percent, and achieved 3 percent annual reduction of CO<sub>2</sub> emissions by using different methods of transport efficiency. UPS also improved its on-road fuel economy by 28.9 percent with the inclusion of hybrid diesel electric delivery vehicles in its ground fleet, which has made a big impact (Dey, LaGuardia, & Srinivasan, 2011). FedEx has teamed up with the Environmental Defense Fund to make the standard delivery truck more environmentally friendly, as a result, FedEx currently operates 330 hybrid-electric delivery vehicles, including an all-hybrid station in New York City. The hybrid trucks improved fuel economy by 42 percent, reduced GHG emissions by 25 percent and cut particulate pollution by 96 percent. In addition to the hybrid-electric vehicle initiative, FedEx operates 58 trucks

fuelled by compressed natural gas, liquefied natural gas and liquefied petroleum gas, in Europe, the Asia Pacific and Latin America. FedEx also has more than 320 LPG and electric-powered ground support equipment in use at its hub in Paris and other operational facilities across Europe, with another 55 on order (Dey, LaGuardia, & Srinivasan, 2011). The use of more fuel-efficient vehicles or alternative energy sources directly reduces greenhouse gas emission and it's a criteria included in the survey (Lau, 2011). Previous surveys also reveal an increasing awareness, interest, and emphasis in green transportation. Similarly the principle of increased use of low-emission vehicles is in agreement with the Green Logistics principles adopted by the Italian automobile manufacturer Fiat and improved vehicle fuel consumption is one of the major Green Logistics opportunities recommended by the global management consulting firm (Lau, 2011). Similarly switch to alternative fuels could significantly decrease vehicle emission factors, as many cause lower emissions than diesel combustion. Another option discussed is hybrid electric vehicles, which may become cost-effective in the future, especially in urban areas where trucks commonly travel short routes on surface streets. Therefore this strategy is strongly implemented by a small group of operators, especially by courier companies. The high effectiveness of the strategy is evident in the results obtained by the users, as discussed above. But there are barriers for mass usage of the strategy due to the high cost of operation. Also the availability of necessary facilities is less.

Use of electric vehicles for city distribution systems is another strategy identified through the review which is partially similar to the above strategy, but less popular. A system using electric vans has been tested in Osaka city, Japan from December 1999 to March 2000 and electric vehicles are more environmentally friendly than normal gasoline or diesel trucks, similarly in Rotterdam also, an electric vehicle city distribution system was tested from 1998 and 2002 but problematic procurement and annoying vehicle breakdowns were the main issues of the strategy (Geroliminis & Daganzo, 2005). Nevertheless test studies using electric vehicles in Rotterdam and Osaka have revealed a strong potential for their acceptance (Sathaya, Li, Horvath, & Madanat, 2006). The strategy of using electric vehicles has not been focused much but as it uses an alternative source of energy it would be more environmentally friendly than the traditional methods, as emissions would be reduced. Therefore the effectiveness is high. But there are several issues in this strategy. The cost of using such vehicles, the purchasing of them and the operational problems are such issues identified through the literature.

Although not directly related, provide training, environmental information sharing and joint research is an important strategy discussed in related research. In a survey conducted, under strategies for managing and responding to environmental issues-fifty five percent of respondents state that they are currently using the strategy of 'increase education and training of company personnel' (Murphy & Poist, 2203). Under green purchasing practices, in order to ensure that suppliers meet their environmental objectives, the buying firm may deploy collaboration-based activities that include training, environmental information sharing and joint research (Laosirihongthong, Adebajo, & Tan, 2013). Purchasing of transport services too can be considered under green purchasing. Less amount of research could be found on this strategy, but it could be argued that it is an important strategy as human resource is vital aspect of the operation of an organisation. From the top management who takes strategic decisions to middle management and lower level management, training and educating about green logistics practices will influence them more to make more environmentally friendly strategies/practices.

(Song, Wang, Jiang, Yang, & Wang, 2012) has stated that initially more attention should be paid to infrastructure construction. Efficient railway and highway transportation is the key to reduction of energy consumption of logistics service industry. Infrastructure construction can shorten the distance of transportation and lessen transportation circles so as to save energy. This hasn't been discussed much in research, probably due to the fact that infrastructure utilisation strategies are the main focus of the researchers. Also infrastructure provision such as railways and highways is mainly done by the governments, therefore less flexibility can be expected and it is beyond the control of operators.

Management of reverse material flow to reduce transportation is also a strategy identified. Managing reverse material flows to reduce transportation is one of the activities focused on by a survey to compare the green logistics performance of two countries (Lau, 2011). Designing a reverse logistics process (including returns handling, returns shipments) that focuses on the reduction and substitution of the sources through the methods of reuse and recycling is a part of proper management of reverse material flow. Under the concrete implementation on the green logistics system of enterprise, one aspect discussed is the development of reverse logistics (Zheng & Zhang, 2010). Supply chains feel compelled to adopt reverse logistics activities because of competitive, marketing, economic, and environmental reasons (Dey, LaGuardia, & Srinivasan,

2011). It is suggested that especially in developing countries the use this strategy is very less.

Reverse logistics is an aspect included in the sustainability balanced scorecard proposed (Dey, LaGuardia, & Srinivasan, 2011). Under green activities relevant for midstream (Design for) dis-assembly Scrap, shred transportation have been included, for downstream, returns handling and returns shipment (Hoek, 1999). (Perotti, Zorzini, Cagno, & Micheli, 2012) through their literature review, have identified reverse logistics as a main green supply chain practice. Under that the following categories have been identified: waste transport and disposal ,materials recycle whenever possible, consumption reduction whenever possible ,materials reuse whenever possible.

(Laosirihongthong, Adebajo, & Tan, 2013) recognise the strategic importance of reverse logistics and describe it as a significant trend in green supply chain management and it has been shown that efficient reverse logistics networks can provide lucrative economic benefits and improve organizational competitiveness. Moreover, the development of reverse logistics is at an infant stage in most developing countries although such countries are increasingly responsible for a large proportion of the world manufacturing and that most studies on reverse logistics have been carried out in developed countries (Laosirihongthong, Adebajo, & Tan, 2013). Reverse logistics practices include product returns, remanufacturing, recovery, recycling, reuse and redistribution (Laosirihongthong, Adebajo, & Tan, 2013). Therefore it can be concluded that reverse logistics strategies have been extensively discussed in research. Also through research it is stated that the related strategies are effective and that a variety of benefits could be gained. Most importantly it can be stated that research on these strategies have been conducted less in developing countries which is a critical research gap.

Related to the above discussed strategy, the strategies of requiring suppliers to collect their packaging material or return packaging to suppliers for reuse or recycling or collect the used products from customers have been included in the Factor analysis of green supply chain practices and performance (Laosirihongthong, Adebajo, & Tan, 2013).

Load freight using 'carpooling transportation' (corporative dispatching mode) is discussed as for many sporadic freight transportations, logistics enterprise always only consider their transportation vehicles and freight sources. However, some vehicles are not fully loaded but cannot wait for other goods because of the arrival time restriction, which results in the waste of

loading resources and high cost of transportation. Consequently, logistics enterprises should share the information and resource, and implement the cooperative dispatching strategy. In the cooperative dispatching mode, various enterprises transport their freights by sharing a vehicle, and split the cost based on their respective quantity of goods and transportation distances. As the result, the resource utilization rate can be increased as high as possible. Similar to that joint distribution /integrated delivery can increase resource utilization (Zheng & Zhang, 2010). It is further discussed that unified set of goods and uniform delivery can significantly reduce the flow of goods and effectively eliminate the staggered transport to ease traffic congestion conditions, which can improve the efficiency of urban freight transport, reduce no-load rate and significantly reduce the level of inventories. Through this strategy goods to be delivered can be consolidated into shipments which will reduce the number of trips undertaken in the system. No practical implementation situations have been discussed in research and therefore no specific information is provided about its effectiveness or issues.

Consideration of green aspects for transport procurement is also a strategy discussed in research. There has been an increase of research on how to achieve greener logistics by reducing transport emissions in different ways. Green procurement or green purchasing has been addressed in many disciplines and from many different perspectives. In a transport setting, this would regard how the service is produced, taken into account both the equipment used (the vehicle and its propulsion technology), and the way in which the equipment is utilized. An example of the former include what Euro-class a vehicle has, an example of the latter whether drivers are trained in Eco-driving (Kohn and Brodin, 2008). One of the most important and influential performance measurements is compliance with sustainability regulations (Min and Galle, 1997). But greening transport procurement is not just about putting demands on the service provider. According to Rao and Holt (2005), "Green purchasing strategies arguably revolve around two key components, the evaluation of suppliers' environmental performance and mentoring to assist suppliers improve this performance" (Rao and Holt, 2005). Transferring the idea to transport procurement, the greening of this activity consists both of evaluating the transport providers' sustainability performance as well as assisting them to improve their sustainability performance. By not just demanding change, but also working together with a supplier, a company may more easily meet and exceed expectations from their customers, and reduce costs (Walton et al., 1998). Greening the purchase function is often suggested as a potential mean to improve environmental performance

while improving effectiveness (Rao and Holt, 2005; Sroufe, 2003; Walton et al., 1998; Porter and van der Linde, 1995).

This strategy has been focused on by researchers and could be used to influence the transport service providers to make their services more environmental friendly. It also emphasises the need for collaboration between transport customers and suppliers when it comes to development and implementation of green logistics distribution strategies.

#### IV. DISCUSSION AND CONCLUSION

When looking into the different strategies that have been discussed in research, it can be concluded that there is a wide variety of green logistics strategies that have been discussed. Further the strategies have been discussed in different levels. Modal shift and intermodal transport can be concluded as strategies that contributes greatly towards green logistics as depicted by several researches and because emissions are directly related to the mode of transport used. The optimization of transportation dispatching, and select transport routes rationally ( to avoid idle travelling, convection transport, circuitous transport and repetitive transport) to improve vehicles' actual load rate and round-trip carrying rate effectively is a strategy which has been taken into consideration in several studies. Use of environmental friendly materials, improving material utilization, designing foldable pack to raise vehicle volume utilization rate, improve packaging designs (eco-design) and techniques to reduce the amount of packaging and protective material through lightweight design are several related green logistics strategies which have been extensively discussed.

On the other hand, less research has focused on use of techniques and technologies such as: cruise control, reductions in left hand turns, GPS units, and automatic engine shut down devices, but practically companies such as FedEx have reduced the amount of left turns, while organizations use GPS to monitor the movement of vehicles. Although not directly related, provide training, environmental information sharing and joint research is an important strategy identified but lesser amount of research has discussed this strategy, but it could be argued that it is an important strategy as human resource is vital aspect of the operation of an organisation. From the top management who takes strategic decisions to middle management and lower level management, training and educating about green logistics practices will influence them more to make more environmentally friendly strategies/practices. A significant finding is that reverse logistics strategies have been researched on less in developing countries and more in developed countries. Therefore the focus by developing countries is not up to

the level of focus in developed countries. The strategy of using electric vehicles has not been focused much but as it uses an alternative source of energy it would be more environmentally friendly than the traditional methods, as emissions would be reduced, but the cost of using such vehicles could be a barrier. Load freight using 'carpooling transportation' (corporative dispatching mode) is also a strategy which helps to reduce the number of trips. In this manner different green logistics strategies have been discussed in research that have been conducted and while certain strategies have been extensively discussed, other strategies have only been discussed lightly. The findings suggest that environmental friendly logistics structures are characterised by fewer movements, less handling, shorter transportation distances, more direct shipping routes and better utilisation of vehicles. Strategies related to modal shift, hybrid fuel technology, optimisation of routes, proper network design, reverse logistics and green transport procurement have been identified as effective strategies. Also several barriers have been identified through this study. Barriers have been mainly identified for electric vehicles including the cost of using such vehicles, the investment for purchasing them and operational problems. Use of alternative energy has barriers due to energy sourcing, investment for vehicles, maintenance and commercial viability. Therefore as recommendations for further research, it could be recommended that the strategies which are effective but have been discussed lightly must be researched on to make them more feasible. Also it can be recommended that research be undertaken on the effective strategies to make them more commercially viable as it is most of the big organizations who are using these strategies for now.

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