TrainERGY project

Good practice - Green external operations management

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1 Introduction

1.1 Good practice definition

Good practice is a method or technique that has been generally accepted as superior to any alternatives. It has been proven to work well and produce good results[1].

1.2 Good practice criteria

The following set of criteria will help you to determine whether a practice Is a 'good practice':

- ***Effective and successful***
  A good practice has proven its strategic relevance as the most effective way to achieve a specific objective; it has been successfully adopted and has had a positive impact on individuals and/or communities.
- ***Environmentally, economically and socially sustainable***
  A good practice meets current needs, in particular the essential ones of the world's poorest, without compromising the ability to address future needs.
- ***Technically feasible***
  Technical feasibility is the basis of a good practice. It must be easy to learn and implement.
- ***Inherently participatory***
  Participatory approaches are essential, as they support a joint sense of ownership of decisions and actions.
- ***Replicable and adaptable***
  A good practice should have the potential for replication and should therefore be adaptable to similar objectives in varying situations.
- ***Reducing disaster/crisis risks, if applicable***
  A good practice contributes to disaster/crisis risk reduction for resilience.

[1] Nash, J. and Ehrenfeld, J., (1997), "Codes of environmental management practice: assessing their potential as a tool for change." Annual Review of Energy and the Environment 22, pp. 487-535; Bretschneider, S., Marc-Aurele, F.J., Jr., and Wu, J. (2005), "Best Practices" Research: A methodological guide for the perplexed, Journal of Public Administration Research and Theory , (15) 2, pp. 307-323.

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2 Good practice description

2.1 Objective

The main objective of this document is to describe good practice about *green external operations management* for companies in manufacturing field, especially for those involved in warehousing and distribution. In particular, the purpose is to improve efficiency in terms of carbon emissions reduction, while maximizing "good" outputs (profits) and minimizing "bad" inputs and outputs (waste, emissions, water).

2.2 Introduction

The following good practice can be followed by whatever company sensitive to environment respect, or by companies with carbon emission levels that don't respect standards. It can be applied in supplying and distribution when in project phase. In order to be developed, it has to be economically convenient for the companies because if not, they would not follow it. So, the objective is to propose green oriented strategies without leading to an increasing of costs. Therefore, this good practice could be useful to improve external logistics efficiency.

2.3 Actors and Stakeholders

When one or more companies along the supply chain use this good practice, benefits could reach every actor and stakeholder of the chain, from suppliers' suppliers to customers' customers. Aside from the manufacturing companies, more partners could be directly involved, partners such as institutions (which can apply incentives policy), donors (which can help eco-friendly companies), environmental companies, consulting agencies (which can help implementing green strategies).

2.4 Methodological approach

The methodology is meant to be applied in external logistics field, especially throughout purchasing, warehousing and distribution processes. Even if there is a mismatch between green warehousing and green transportation objectives, a green external operations management approach can overcome it, getting to the right trade off.

The approach consists in:

- Optimizing routes and modes of transport to reduce number of trips and hence reduce emissions;
- Optimizing number of trips of a carrier e.g. optimize truck loads;

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- Align incentives with logistics providers to help achieve the business objectives for Green Supply Chains;
- Promote usage of green fuels through selecting suppliers who emphasize on using clean fuels.

The procedure for implementing the good practice consists in:

- Analysis of existing transportation strategies to identify potential hotspots;
- Intervention on hotspots to optimize number of trips.

The most used external operations strategies are:

- *Lot for lot*, in which the company orders for each period only the amount required for the same period so that there is no inventory and the total cost is given by the ordering cost;
- *Periodic order quantity*, in which goods are delivered over regular time intervals. Given a number T of time periods, the company orders the amount of goods needed to satisfy demand in that period of time;
- *Fixed order quantity,* in which purchased quantities are fixed and frequency depends on the demand.

Whenever possible, from a "green transportation" point of view these last two strategies should be used to reduce number of trips and consequentially emissions. Sometimes there are limits to the possibility of choice, for example when goods are perishable or when demand is too unpredictable. Otherwise, from a "green warehousing" point of view, sometimes companies are willing to use more a *lot for lot* technique in order to keep their warehouses as empty as they can.

It is now clear that in order to find the right trade-off between green warehousing and green transportation, a mix of the all three techniques, according to not only each company configuration and necessity, but also their suppliers' and customers', can bring to a successful outcome.

2.5 Validation

In order to get a confirmation by beneficiaries that the practice properly addressed view, the practice can be validated with the stakeholders and final users through surveys and interviews regarding their current situation and comparing it with the previous and forecasted future ones. All these surveys will be collected, stored and shared into databases to produce statistics that can be read to bring future improvements.

2.6 Results/outputs

First of all, every company that use *green external operations management* will notice improvements in environmental impact, which can be calculated using tools like Scenat and Microsoft Power BI. Therefore, these techniques can lead also to transportation and warehousing costs reduction.

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2.7 Impact

On long-term the project is expected to give a contribute in reducing global warming if applied by the majority of existing companies. Also, these companies will get bigger popularity and visibility, earning prizes and awards for being eco-sustainable.

Successful outcomes can be measured with some indicators, such as:

- # late deliveries / # total deliveries;
- Benchmark analysis (# of means used, emissions level, # trips, etc.)

2.8 Success factors

The key factor that distinguish this practice from other similar ones is the mixing of different techniques in order to improve different aspects. For instance, using a *lot for lot* strategy reduces inventory cost, while *Periodic order quantity* and *Fixed order quantity* reduce ordering and transportation cost. So, their right mix, according to each company necessity will bring visible successful outcomes.

To make this good practice successful, there are some optimal conditions needed. For example, government incentives and sensitization campaigns.

2.9 Constraints

The main constrain of *green external operations management* is first of all the demand uncertainty, which is the base of the descripted models. Then another challenge could be the complexity of the supply chain network, that could be very intricate and manifold.

To make the best use of this practice, it's necessary to keep control over costs, avoiding environmental aspects from undermine economic ones, and vice versa.

The following tips can help to maximise the benefits of the tool:

- Use *lot for lot* technique when pursuing a lean manufacturing strategy;
- Use *Periodic order quantity* when the amount of raw materials or supplies usage is consistent and predictable;
- Use *Fixed order quantity* when economy of scale is possible.

2.10 Lessons learned

A key message learned from the practice is that getting "green" doesn't always mean increasing costs. Moreover, it gives opportunities for decision making, as it becomes a crucial aspect.

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2.11 Sustainability

This practice results to be resilient and sustainable because it's just a logistic re-organization, that doesn't lead necessarily to further investments in infrastructures and transport means.

2.12 Demonstration

Looking at a specific case study, Confettificio Iovino, an Italian sugar almond producer, a demonstration of an application of the tool can be seen.

At first, about supplies, the technique used is *periodic order quantity,* but the situation can be improved by substituting this strategy with a *fixed order quantity* one just for non-perishable goods in order to reduce number of deliveries. Meanwhile, about distribution, the initially preferred technique is *lot for lot* for all deliveries. In order to reduce the number of trips, this strategy should be changed with a *periodic order quantity,* but this would lead to an excessive increase of storage. So, the solution is to apply *lot for lot* but just for the closest deliveries.

2.13 Related website(s) / resources

Operations management - Modelli e metodi per la logistica (G.Bruno, 2012)

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