



TrainERGY project

Good practice - Template

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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 results¹.

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

GP has to be related with one of the topics covered during the training (e.g. Green purchasing, Technologies for reducing waste or Green external operations management). If it is possible, you can try to describe the practice that you would recommend to the supply chain analysed using ScENAT tool.

You can use different resources e.g. company websites, business reports, scientific papers, ScENAT analysis results and your business experience.

Try to answer to all below questions and to not exceed 3000 words.

2.1 Objective

A reduction in raw material supply, increased utilisation of landfills and ongoing pollution has led to the integration of environmental management with operations management. Environmental Management should now be viewed as a business driver and not a business cost and so goes further than simply acting environmentally friendly. Reducing the carbon emissions of supply chain is the key element to achieve green external operations practice (Koh, et al, 2012). This has led to the increased interest in green materials selection, green transportation, and green distribution (S. K. Srivastava, 2007).

This review will cover the supply chain of 2G Inc. a double glazing window company who primarily supply the construction industry.

2.2 Introduction

The aim of Green External Operations Management is to improve the environmental sustainability of the operations within the supply chain (S. Perotti et al.; 2012). Details of this good practice and how it can be

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implemented are described in the Methodology below. 2G Inc. would use this tool between themselves and their suppliers, and also their customers for all deliveries to ensure that the most sustainable method (appropriate to the supply chain's needs) is employed.

2.3 Actors and Stakeholders

The primary beneficiaries of the green external operations management practice are those other players in the supply chain who actively engage with 2G Inc. to encourage sustainable improvements i.e. suppliers and customers.

To implement this practice, the first stage would be to connect with the first tier supply chain and work together to determine how the practice could work for both parties. Considerations regarding warehousing, delivery periods and delivery quantities are some (but not all) of the barriers that will need to be discussed between each party; these aspects are discussed in more detail in later sections of this document [Giuseppe Bruno presentation, 2016].

Collaboration between the suppliers, 2G Inc. and the customers can lead to improved reputations, lower impact on the environment and compliance with regulation (to name a few) [Grazyna Wieteska presentation, 2016].

Other stakeholders include the distribution companies (if separate to the supplier), the government (policies such as the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), and Waste Electric and Electronic Equipment (WEEE) must be adhered to), the local community may be affected if delivery volumes are high (e.g. traffic and noise) and the 2G Inc. employees (this is not an exhaustive list).

2.4 Methodological approach

In order to achieve green operations, it is important to apply an integrated approach to carbon emission accounting and management along the supply chain with a view to evaluate and upgrade its performance using a comprehensive sustainability metric. SCEnAT can be applied to decarbonise the product supply chain (Koh, et al 2013).

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There are three transportation and distribution strategies that can be used to address the green external operations management: Lot for Lot, Periodic order quantity, and Fixed order quantity.

- Lot for Lot: ordering for each period only the amount required for the same period. No inventory with high total cost.
- Periodic order quantity: the quantities are delivered over regular time intervals.
- Fixed order quantity: purchase quantities are fixed (this approach is used when economy of scale is possible).

The procedure of building a decision support system to optimise the best system is outlined below (Horton, et al 2015; Koh, et al 2013):

1. Design, transportation and warehouse plan (supply chain mapping)
2. Analyse (supply chain carbon calculation)
 - a. Optimise the transportation route, model and number of trips of a carrier, and the emissions of transportation
3. Identify the potential interventions
4. Evaluate the supply chain performance
5. Make a decision

2.5 Validation

Method validation is the process used to confirm that the analytical procedure or methodology employed for a specific test is suitable for its intended use. Results from method validation can be used to judge the quality, reliability and consistency of analytical results; it is an integral part of any good analytical practice.

Analytical methods need to be validated or revalidated:

- before their introduction into routine use;
- whenever the conditions change for which the method has been validated (e.g., an instrument with different characteristics or samples with a different matrix); and
- whenever the method is changed and the change is outside the original scope of the method.

Data collection is required throughout the process to ensure that validation is robust and meaningful.

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2.6 Results/outputs

In using the Periodic purchasing approach, 2G Inc. will be liaising with key suppliers in ensuring continuous supply of raw materials and prevent unplanned interruptions in supply. For example, Teesside Glass which supplies the company with their Uncoated Flat Glass, will be able to plan ahead in ensuring they meet their demand. On the other side, supplier relationships with construction companies that are the main customers for 2G Inc's Koby Design windows.

2.7 Impact

Long term improvements can be achieved in the area of green external operations particularly in the area of purchasing, transportation and warehousing. In addition, good practices employed by companies can be reviewed and evaluated in order to provide further environmental savings through additional intervention. Changes can be made in relation to transportation and warehousing strategies over the long term which will also generate good knock-on effects for both suppliers and customers.

2.8 Success factors

Elements that distinguish this practice from other similar ones are:

- Four integrated supply chain modules: supply chain mapping, supply chain carbon accounting, low carbon interventions, supply chain performance evaluation.
- The carbon emission of supply chains has been considered

Conditions required for practice the to be successful:

- Cost effective (Brandenburg, et al 2014)
- Customer satisfaction
- Eco-friendly/eco-efficiency
- Institutional drivers (eg. companies adopt environmental initiatives coming from regulators, the market and competitors) (Colicchia et al 2013)

2.9 Constraints

Challenges (Marchet et al 2014, Colicchia et al 2013):

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- Lack of the knowledge or technology to perform green practice
- Uncertainties of demand and supply
- Companies after adoption (green supply chain) do not implement other initiatives that support the practice as they are not seen to have an economic benefit (personnel training, appropriate structures for the evaluation and measurement of the green practice and specific technical skills and competences are seen as additional costs)
- Uncertainty prevails in the evaluation and measurement of the environmental initiatives, in particular as to which measures can reduce which costs, which can be the most efficient, which can be used directly vs mid-term or long-term
- Integration amongst the players of the supply chain (cooperation with customers on reverse logistics, collaborative partnership with other companies/third party logistics companies (3PL)).
- Distribution strategies and transportation execution (e.g. alternative fuels, less polluting vehicles, effective shipment consolidation, redesign of logistics system component for greater environmental efficiency, etc)
- Warehousing and green building (eco-friendly building design, energy-efficiency handling equipment, water systems)

How to make the best use of the tool:

1. Cooperation with suppliers and 3PL service company to implement the purchasing procedure (information sharing)
2. Cooperation with 3PL and customers to implement the management deliver procedure (information sharing)

2.10 Lessons learned

SCEnATi is a useful tool to analyse the hybrid life cycle assessment. Companies can use SCEnATi to analysis their supply chain, then make a decision to make improvements.

2.11 Sustainability

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Sustainable development has been defined as “a development that meets the needs of the present without compromising the ability of future generations to meet their own needs”; the main concept supporting its operationalisation is that of the triple bottom line (S. Seuring and M. Muller; 2008). The triple bottom line philosophy proposes that where the three pillars of sustainability (environment, society, economy) overlap there are not only environmental and societal improvements to be made but also long-term economic advantages (C. R. Carter and D. S. Rogers; 2008).

In order for 2G Inc. to implement a sustainable green external operations management system there are a number of factors that should be considered, the main consideration is to have buy in from your suppliers and customers to ensure that the change is implemented effectively (change management is not covered in the scope of this work).

From an environmental point of view, the main environmental aspects of external operations management is the movement of materials from one member of the supply chain to another. If the methodologies outlined above are implemented effectively there will be a reduction in the environmental impact of the supply chain which can lead to cost savings (Grazyna Wieteska presentation, 2016). A negative impact may be incurred by reduced shift patterns for drivers if this practice is implemented but it would also reduce the amount of traffic in the local area which would have a positive effect on the local community.

If there are less deliveries to and from the 2G Inc. manufacturing site then there will be fuel cost savings made by both the suppliers and 2G Inc. (or a contracted logistics company). Other environmental and cost savings could be made by purchasing hybrid or electrically fuelled trucks (this will incur a large upfront cost but there would be a payback schedule based on the savings made). Research could be conducted to determine if the embedded CO₂ in the supplied goods could be reduced and if lighter materials could be used to reduce the weight of the load (e.g. scenario 2 but with further research into material substitution).

2.12 Demonstration

SCEnATi is a decision support tool, in the context of green external operations management it can be used to determine the environmental impact of the logistic strategies implemented by 2G Inc. For example, if the mileage travelled, weight of the product and greenhouse gas intensity of the transportation method are known the kg CO₂ equivalent can be calculated using SCEnATi. Alterations to these inputs can then be made to determine which changes would yield the most environmental benefits. This may be choosing a supplier that is closer to the manufacturing unit, using a hybrid vehicle, reducing the weight of the product

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or a combination of these. The output of SCEnATi allows an assessment to be made and a visual comparison can be used in marketing material.

2.13 Related website(s) / resources

Materials that can be indicated as reference to the good practice material.

S. K. Srivastava, “Green supply-chain management: A state-of-the-art literature review”, International Journal of Management Reviews, 2007, 9 (1), 53-80

S. Perotti, M. Zorzini, E. Cagno, G. JH. L. Micheli, “Green supply chain practices and company performance: the case of 3PLs in Italy”, International Journal of Physical Distribution & Logistics Management, 2012, 42 (7), 640-672

S. Seuring, M. Muller, “From a literature review to a conceptual framework for sustainable supply chain management”, Journal of Cleaner Production, 2008, 16 (15), 1699-1710

C. R. Carter, D. S. Rogers, “A framework of sustainable supply chain management: moving toward new theory”, International Journal of Physical Distribution and Logistics Management, 2008, 38 (5), 360-387

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Gino Marchet , Marco Melacini , Sara Perotti , (2014) "Environmental sustainability in logistics and freight transportation : A literature review and research agenda", *Journal of Manufacturing Technology Management*, Vol. 25 Iss: 6, pp.775 - 811

Colicchia, C., Marchet, G., Melacini, M. and Perotti, S., 2013. Building environmental sustainability: empirical evidence from Logistics Service Providers. *Journal of Cleaner Production*, 59, pp.197-209.

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Koh, S.L., Genovese, A., Acquaye, A.A., Barratt, P., Rana, N., Kuylenstierna, J. and Gibbs, D., 2013. Decarbonising product supply chains: design and development of an integrated evidence-based decision support system—the supply chain environmental analysis tool (SCEnAT). *International Journal of Production Research*, 51(7), pp.2092-2109.

Horton, P., Koh, L. and Guang, V.S., 2016. An integrated theoretical framework to enhance resource efficiency, sustainability and human health in agri-food systems. *Journal of Cleaner Production*, 120, pp.164-169.

(Grazyna Wieteska presentation) Presentation given by Grazyna Wieteska 22/11/16 at the TrainERGY event in Sheffield UK

(Guiseppe Bruno presentation) Presentation given by Guiseppe Bruno 21/11/16 at the Train ERGY event in Sheffield UK

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