Principles of Ecology and Management:

International Challenges for Future Practitioners

Alan Sitkin

(G) Published by Goodfellow Publishers Limited, Woodeaton, Oxford, OX3 9TJ
http://www.goodfellowpublishers.com

Design and setting by P.K. McBride

6 Green Operations

Contents

Learning objectives

After reading this chapter, you will understand how to:

- Modify corporate operational processes using green engineering principles
- Reduce the data function's environmental footprint
- Redesign manufacturing schemes to produce fewer 'non-product' externalities
- Cut waste during products' post-industrial handling

Introduction

Some observers feel that the production side is where companies are most likely to achieve the most progress in terms of environmental sustainability (Vogel 2005). This is because operations-related greening efforts have the dual benefit of not only optimising internal processes but also positioning companies in the market for **clean technology** (see Chapter 10). Implementing green operations is easier said than done, however. At the practical level alone, there are already a number of obstacles to overcome, ranging from the high cost of rebuilding a firm's industrial apparatus to many front-line operatives' reluctance to engage in some of the gruelling and even unhealthy tasks associated with green operations (Schendler 2009). Other hurdles are more conceptual in nature, first and foremost being the ecological inertia affecting people who do not react well to change and are therefore incapable of internalising green operations' holistic principles. Indeed, many sustainability writers evoke the need for a new mental model focused on reducing the flow of physical goods throughout the whole of the industrial economy, with upstream professionals' role no longer revolving around material performance per se but seeking instead to create functionalities that will help customers to achieve their ultimate goals. This subtle shift would have vast consequences: appliance makers might provide refrigeration instead of refrigerators; utilities heat and lighting instead of electricity. Essentially, the shift would entail piloting corporate production functions as if they were service activities fostering the kind of lessor–lessee relationship to which customers are already accustomed, for instance when they fly on an airplane or stay in a hotel (Richards and Frosch 1997). Of course, this kind of service mindset will be very foreign to many manufacturing specialists.

Clean technology: Set of industrial principles where energy or power are generated in an environmentally friendly manner.

? How amenable are industrial engineers to operational greening?

It may soon become more widespread, however, given growing evidence of the responsibility that traditionally 'brutal' production processes bear for the frightful ecological challenges facing Planet Earth today. The manufacturing function stands accused, ever since the Industrial Revolution, of participating in a 'commoditisation of nature', with industrialists imposing harsh and unadapted synthetic processes on a vulnerable ecosphere instead of working within the boundaries of sustainability (Braungart and McDonough 2009). Thus, the obsolescence built into many products – or the wastefulness of chemical and engineering practices where an estimated 90 to 95 per cent of all material inputs are consumed and rejected during the

production process without figuring in the final product – constitute clearly unsustainable ways of organising industry. Notwithstanding the strength of old habits, there is a broad consensus today in favour of the mass greening of companies' physical activities.

Key issue

The manufacturing function stands accused, ever since the Industrial Revolution, of participating in a 'commoditisation of nature'.

Hence the growing relevance of key green constructs such as life-cycle assessment, recyclability, total environmental impact – and where possible, zero waste. A good example of a company that has almost achieved this ambitious goal is pioneer modular carpet manufacturer Interface, for whom less than 1 per cent of the 400 million pounds of raw materials purchased in 2009 ended up in landfill (Greenbiz 2010b). Of course, such recycling targets will suit some products – goods that have longer lives such as carpets or houses; require frequent upgrades such as software or appliances; or are harder to dispose of such as chemicals or minerals – more than others (Friend 2009). In general, however, the general green business paradigm of focusing on holistic, long-term consequences more than on specific, short-term goals is as applicable to industrial operations as it is to any other corporate function.

6

■ Knowledge management

The fundamental goal of any ecologically harmonious production operation is to optimise the use of material and energy inputs while minimising the generation of environmentally damaging outputs. This credo, widely known as **eco-efficiency**, has long been recognised in business literature, dating back to the mid-20th-century writings of Buckminster Fuller, an advocate for designs that imitate nature and offer 'more for less'. At the same time, it is noteworthy that other leading environmental thinkers have criticised eco-efficiency, accusing it of being a conservative concept that perpetuates bad behaviour by alleviating the harmful effects of brutal production processes instead of eliminating them. In this latter view, what is required is a wholesale reconstruction of upstream activities, a new industrial model in which sustainability is embedded in processes instead of added on as an afterthought.

Eco-efficiency: Organisational process characterised by lower material and energy intensities, less toxicity, greater recyclability and maximal use of renewable inputs.

? How useful is eco-efficiency if the overall production system is unsustainable?