# Sustainable Value

Professor Martin Charter, Coordinator, The Centre for Sustainable Design (www.cfsd.org.uk)
Email: mcharter@surrart.ac.uk

## Abstract

There has been considerable discussion over the importance of generating *business* value and of managing internal and external value chains. However, where does 'triple bottom line' sustainability fit into this discussion? With social issues moving alongside eco-efficiency and various standards evolving to help manage *soft* issues – namely SA8000, AA1000, ECS2000 and SI10000 (Charter & Clark 2002) – this is becoming a major challenge for many boardrooms. However, research completed by Project Sigma (www.projectsigma.co.uk) has indicated that management of the 'triple bottom line' is characterised by silo mentalities and a lack of joined-up thinking. This is being further complicated by the advent of 'extended enterprises' with outsourced manufacture. All this is happening in a 'global fishbowl' with various stakeholders starting to peer at 'the world behind the product', asking a new series of questions. With the growing use of internet and global news networks this means that many companies and brands are in the spotlight, facing a new set of challenges in relation to the social responsibility of their operations. All this means that there is a changing relationship between *product* development and supply chain management (SCM) – particularly when there is an increasing blurring of the edges of products and services with supply chains becoming 'supply networks'. With growing concern over 'brand trust' in consumer markets and 'producer responsibility' in several business-to-business (B2B) sectors there is a need to raise awareness of environmental and social issues amongst diverse networks of suppliers – to ensure risks are not imported. However, awareness and understanding of the issues is often very low amongst suppliers, so there is a real need to develop partnerships to transfer knowledge with a focus on 'two-way' communications. In this changing world, the delivering of *value* is getting more complex. When environmental and social considerations are added to the equation, further complexity is added with each *product* having a combination of positive and negative sustainability impacts. But, the changing agenda, includes opportunities, as well as threats. A number of recent reports are starting to highlight the business benefits of a more sustainable approach to business. To accelerate this understanding, sustainability will need to be further integrated into discussions of value. Perhaps the aim of business should be to maximise net *sustainable value* embedded in the product, service or product-service system (PSS)? Understanding, the sustainability impacts of products and services, and increasing net *sustainable value* will be a key challenge – and this will call for a new breed of thinkers and practioners.

## Introduction

> A study by the Conference Board Inc suggests that a high proportion of respondents (42%) believe that companies should be wholly or partially responsible for helping to solve social problems, whilst a further 33% said companies should focus on setting higher ethical standards, going beyond what is legally required.
>
> Source: Zadek, S (2001)

The societal response to globalisation – which inevitably touches on economic, financial, environmental, social and ethical aspects - is becoming a high profile issue for many companies with demonstrations since Seattle being symptomatic of a wider set of concerns. This means that there is an increasing need to take a more holistic view of business sustainability – as corporate social responsibility (CSR) starts to dovetail or even overlap with eco-efficiency in many instances. However, company responses to the agenda vary, with many wanting to keep environmental and CSR issues separate.

> **Quintruple bottom-line**
> • Economic: the relationship of the company (and its activities, products and services) to the local communities that it operates in and the wider national and global economy
> • Financial: relates to decisions and actions taken by the company (and its activities, products and services) in relation to costs, revenues, profits, assets and liabilities - all items that will end up in the balance sheet or profit and loss account
> • Environmental: the impact of the company (and its activities, products and services) on the earth, its physical resources and climate
> • Social: the relationship of the company (and its activities, products and services) to individuals and groups (as human beings) e.g. employees and other stakeholders
> • Ethical: a complex area of perception and judgement that relates to 'right' and 'wrong' decisions and actions taken in by company, individual and stakeholders in relation to its activities, products and services

Increasing visibility of company activities and a breakdown in trust in business by 'civil society' means that various stakeholders are starting to look in more detail at the environmental and social performance of the firm and ask a new set of questions e.g. about working conditions of suppliers in the developing world? Positive or negative associations may influence purchasing, investment and employment decisions and behaviour.

> MORI completed a survey of 1935 British adults and found that during the course of the survey, that 30% had bought a product or service because of a link to a charitable organisation, while 28% had boycotted a company's product on ethical grounds
>
> Source: Adkins, S (1999)

The organisation of business is also continuing to change. Many companies are now divesting of European manufacturing facilities and focusing on design, research and development (R&D), marketing and managing suppliers. The trend towards increased contract manufacture in South-East Asia and elsewhere means that there is a changing relationship between *product* development, supply and value chain or network management. In addition, in many sectors there is an increasing realisation that products may include services, and services may include products. This means that there is a growing need to improve the understanding of the sustainability impacts of the *product* development process. So, with edges and boundaries becoming less clear perhaps we should be thinking more broadly about how to develop more *sustainable solutions.*

> **New agenda**
>
> "CSR is a base requirement of operating in the 21st century and is not an option"
> Tim Sharp, Director of Corporate Communications, Balfour Beatty
>
> "Remember the McLibel case in the UK? Two activists rallied support from around the world using the internet and the media, took on a mighty corporation and brought it to its emotional knees"
> Howard de Souza, Head of Corporate Practice, Ogilvy Public Relations Worldwide
>
> "We believe there is a direct correlation between good performance in integrating corporate responsibility policies and good business performance in general.......it's no longer sufficient just to sit back and simply comply with the law and imagine that's enough. Our customers expect us to go beyond the letter of the law in many crucial areas now.....there is a growing trend towards greater consideration by mainstream investors of the risks and opportunities these issues pose to our business, not for altruistic reasons but simply because the management of an issue such as GM has the potential to affect significantly our commercial performance"
>
> Mike Barry, Environmental Systems Manager, Marks & Spencer Plc
>
> Source: Ethical Corporation magazine - February 2002

The aim of *sustainable solutions* development should be to maximise the net positive *sustainable value* embedded in the product, service or product-service-system (PSS) through minimising negative and enhancing positive impacts at each stage of the lifecycle. Strictly speaking one cannot have a sustainable business, product or service in an unsustainable world but the company will have to define and understand its own context. Understanding sustainability impacts and increasing *sustainable value* will be a key challenge for a new breed of *sustainable solutions developers* – that will have to be comfortable with both technical and *soft* aspects of sustainability, can innovate, build trust and form diverse stakeholder partnerships.

> Recent research in the UK by the Cooperative Bank suggests that around one in three people in the UK purchased on the basis of ethics in 1999. At least 5% of consumers consistently search for ethical labelling, recycle, get involved in boycotts and discuss issues with their brands
>
> Source:  Cowe, R and Williams, S (2000)

## Changing Agenda

Economies, societies and companies produce, assembly and consume millions of products, services and PSS with a range of sustainability impacts.

---

**The Sustainable Business Value Matrix**

The Sustainable Business Value Matrix maps ten dimensions of business sustainability performance with ten measures of business success. Based on extensive research, the matrix reinforces the business case - for sustainable development performance, especially in corporations but also generally. The business case will be shifting over time and is being monitored. Overall the research provides evidence of strong links between business leadership in sustainability performance and business value creation. Positive links to financial performance alone are strong and suggest a business case can be made without resorting exclusively to indirect or intangible measures. The business case is, however, strongest when multiple measures are considered, emphasising the need to take a holistic approach

Of the ten measures of business value or success, brand value and reputation is most positively linked to sustainability performance, confirming that business case analysis should not focus exclusively on financial measures. Reputation and brand value are linked to ethics, values and socio-economic development.

Of the ten sustainability dimensions, environmental process focus is supported by the strongest business case, being strongly linked to shareholder value, operational efficiency, and access to capital and risk profile. The business case for environmental performance is well established and much recited. This is followed by workplace conditions, strong linked to revenue, operational efficiency and human and intellectual capital. Next comes environmental product focus, strongly linked to innovation value. Other factors and links vary in importance.

Source: SustainAbility (2001)

---

Therefore the creators and designers of *sustainable solutions* are likely to become increasingly important from a business process perspective. This will mean *designers* (entrepreneurs, design engineers, industrial designers, procurers, supply chain managers and marketeers) of products, services and PSS will need to understand 'cradle to grave' thinking, determine environmental and social impacts and develop strategies to minimise negative impacts. Importantly, consideration of sustainability should be included early in the innovation process. Tools are emerging to evaluate the environmental impacts of products but there is little research on *green* or broader sustainability impacts of services or PSS, coupled with a lack of methodologies to complete sustainable service development – with services typically being a combination of intangible (services), physical (products) and infrastructure (systems).

---

**Sustainable Services & Systems (3S): key conclusions from recent research**

econcept analysed case studies in Germany, Austria and Scandinavia during 2000. The results indicate that 3S is still a new, unclear and confusing area. There is no common language surrounding the area and there is a need for new tools and methodologies, as well as more in-depth research.

- Positive or negative environmental benefits of 3S are still unclear
- 3S thinking is more accepted in Scandinavia and Switzerland
- Need to understand cultural aspects of ownership e.g. in Switzerland there are examples of sharing, but in Germany the focus is on ownership
- 3S development is faced by a complicated legal framework
- Lack of expertise in 3S
- No strategic 3S tools
- Need appropriate assessment methodologies
- For successful 3S development there is a need for multi-stakeholder participation
- The establishment of 3S partnerships is a time intensive process
- Few companies proactively incorporate environmental criteria into service or system development
- Environmental benefits of 3S are generally indirect spin-offs
- It is important to engage with customers in proactive two-way communications to build confidence

Source: Tischner, U (2000)

---

It is essential to be clear about the relationship between outputs, process and goals. *Sustainable solutions* - products, services or PSS - maybe considered as *outputs* and sustainable *product* design & development (SPDD) as the *process* to deliver those *outputs*. However, the *goal* should be to deliver higher levels of net positive *sustainable value* [that satisfies customers and other stakeholders] through

those *outputs.* To enable this there needs to be senior level commitment to developing *sustainable solutions* that deliver *sustainable value*, in addition there will need to be processes established to enable ideas to 'bubble up' from the ground floor or indeed from any part of the 'extended enterprise' including its customers or suppliers. But, perhaps the most difficult area to involve and convince of the benefits is middle managers, quite simply because their focus is on another 'triple bottom line' - financial, financial and financial.

---

**The Rise Of Stakeholder Value**

It is generally agreed that the primary aim of companies is to create and deliver value. The traditional focus has been on value for shareholders and to a lesser extent customers and other stakeholders. There is increasing recognition that a successful firm delivers value for all its stakeholders and this challenges the still entrenched view that companies only exist to serve the, often short term, interests of shareholders. The business case for sustainability is becoming increasingly clear and lies in its positive effect on business value. Value is central to the concept of sustainable development in that it about creating economic value while conserving environmental, cultural and other value. In a sustainable system, businesses should meet multiple stakeholder needs whilst minimising negative environmental and social impacts by means, for example, of value loops and networks retaining materials in the system and creating new, fair employment opportunities.

Source: SustainAbility (2001)

---

There maybe high level rhetoric by the Chairman on business sustainability issues in opening statements in the corporate sustainability report and motivation amongst *interesteds* lower down the organisation, but unless middle management buy into the need for *sustainable solutions*, strategies and programmes will not get funded, implemented or operationalised. To progress the agenda will require the development of appropriate incentives that will need permeate down through each tier of the organisation. Sustainability projects will only progress so far within companies using *green* arguments and will fail unless organisational functions are clearly sold on business benefits. Therefore it is important to open dialogue with internal and external stakeholders in words that they understand e.g. marketing in *marketing language*, supply chain in *supply chain language*. The 1st phase has focused on the technical, engineering eco-design agenda and has often ignored the commercial rationale. This means that there is a growing need to develop a business model for *sustainable solutions* with more examples of the financial benefits of value created.

---

**Sustainable Value (the goal)**

Sustainable Value is the aggregate sustainability impacts (economic, environmental, social and ethical) of a solution (product, product-service, service, system) throughout its life cycle - these impacts can be positive or negative. The aim is to continuously improve the net Sustainable Value (positive > negative impacts) of a solution. In defining the embedded Sustainable Value, there is a need to consider all the elements in the nternal and external value chain that go to deliver the solutions. This also means considering the business systems used by 'solutions developers' and their suppliers - particularly the transformation processes related to social and natural capital. Sustainable Value is a holistic, stakeholder-driven process that focuses on delivering value to all stakeholders involved in creating and providing Sustainable Solutions. The goal should be design-in higher levels of Sustainable Value.

Source: Charter. M, Clark. T (2002)

**Sustainable Solutions (the output)**

Sustainable solutions are products, services, hybrids or system changes that minimise negative and maximise positive sustainability impacts economic, environmental, social and ethical) throughout and beyond the life-cycle of existing products or solutions, while fulfilling acceptable scietal demands/needs. Sustainable solutions require multi-stakeholder engagement and involve changes or shifts in consumption and production patterns. The aim of sustainable solutions is to create a positive net sustainable value (positive impacts should outweigh negative impacts) for all stakeholders in the delivery process. Changes may be incremental at the product level or radical if system shifts are needed.

Source: Charter. M, Tischner. U (2001)

**Sustainable Product Design & Development (the process)**

Sustainable Product Design & Development (SPDD) is the management process of integrating environmental, economic, social and ethical aspects into the solutions development (product, service or PSS) process from idea generation through to launch and beyond. All solutions have a sustainability impact - and the aim should be to create positive net Sustainable Value. SPDD should be based on lifecycle thinking that aims to identify and then minimise negative sustainability impacts from 'cradle to cradle'. The aim should be satisfy customers and users that buy and then use the solution, as well as other stakeholders who have a stake' in the development of sustainable solutions

Source: Charter. M, Clark. T (2002)

The 'state of the art' in *sustainable solutions development* is eco(re)design with a focus on 'design for recycling or dismantling'. However, there are some isolated examples of eco-innovation where companies are incorporating environmental thinking into the creativity phase of product development (e.g. Philips Consumer Electronics) and other approaches to sustainable product design e.g. the use of the McDonough Braungart Design Chemistry (MBDC) protocol with Rohner Textil. However, social considerations have as yet, not been integrated into discussions of sustainable *product* design. Companies and individuals will need to develop a passion for and become obsessed with creating *sustainable solutions* that deliver higher levels of net positive *sustainable value*, if they are to remain competitive in an increasingly transparent and sensitive world.

---

**Value scenarios using examples from the print sector**

Value Creator
- Partnering with a design company to extend capability and streamline pre-print processes
- Introducing solvent-free production processes, thereby anticipating future costs of compliance

Value Conserver
- Protecting existing market share by achieving ISO14001 certification in line with customer requirements
- Managing operations in line with regulatory requirements

Value Limiter
- Negotiating more competitive terms with key suppliers, but ignoring opportunities to specify re-usable packaging
- Specifying new IT systems, but ignoring the opportunities presented by computer-to-place technology

Value Destroyer
- Ignoring potential future transport and access problems, as part of a business expansion programme
- Ignoring a trend towards clear association between greeting card production and charitable causes

Source: Kemp, V (2002)

---

## Sustainable Solutions Innovation

Most existing tools are based around eco-efficiency rather than broader sustainability thinking - and the inclusion of social and ethical issues in business discussions is often problematic for environmental managers and mainstream business functions due to 'silo' mentalities e.g. "social issues, that is a party political issue or someone's responsibility" or in the latter " sustainability - what do you mean - sandals and brown bread - what does that have to do with my job, business and the top-bottom".

However, if we want to move beyond eco-efficiency towards 'Factor X' reduction in environmental impact a focus on process improvements alone is not sufficient. An approach that takes consideration of product functions as a starting point provides greater opportunities to find major jumps in eco-efficiency. 'Improving design' can take place at various levels: optimisations of the existing product (usually short-term), re-design (medium term), and searching for a new way of fulfilling the same function (functional innovation). The latter category of product innovation provides potential for reaching 'Factor X' (see figure 1).

Figure 1: Levels of environmental product innovation (see e.g. RAND, 1997; Weterings et al., 1997)
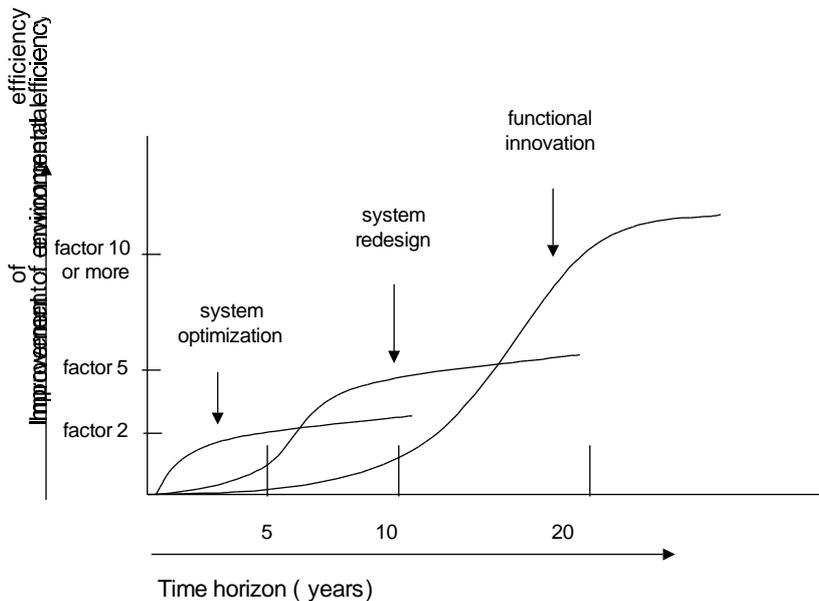


To produce the conditions that will enable functional innovations to be achieved will involve processes that go well beyond the design influence of one or even a cluster of companies requiring the involvement of many stakeholders (e.g. Geels and Kemp, 2000; de Bruijn and Tukker, 2002). For individual companies, however, it is clear that figure 1 represents a challenge on two levels. First, developments related to functional innovations – have a clear *strategic* component with the clearest driver to implement *green* activities being the short- and/or long-term contribution to the internal and external value chain. Requirements for 'Factor X' environmental impact reductions are likely to be translated into pressures on business that will have an impact on a companies' strategy, choices in product portfolios, etc[1] (Cramer, 1997; WBCSD, 1999; Elkington, 1998, Fussler, 1996, Klostermann and Tukker, 1998). Hence, this level of eco-design requires activities like scenario analysis, backcasting, strategy workshops, etc., focused on what consequences a 'Factor X' future might have for the firm. Second, optimisation and re-design have a clear practical design component. Designers must have available quick and easy to use information about environmental impacts related to their design decisions. Practical procedures must be developed to ensure the environmental aspects are embedded into the design process. The 'state of the art' here implies that a firm has developed eco-design manuals, formulated clear environmental design rules, etc. Figure 1 reviews these other strategic and practical elements of eco-design[2].

---

**Redefining the value equation at IKEA**

IKEA has a worldwide network of sources selling simple, low cost, high quality furnishings made to Scandinavian design but globally sourced. The key to IKEA's success is a redefintion of the value equation between the company and its customers and suppliers. The company's stores are convenient to use and provide family friendly facilities. Their products are largely flat packed for self-assembley at home. So the customer is mobilised to add his or her own value in return for a lower core product. IKEA's suppliers are all embraced in the innovative values equation: provided they keep costs down, they receive access to global markets, technical support and even equipment leasing. Thus the company has been described as "more than a link in the value chain. It is the centre of a constellation of services, goods and design".

Source: Wheeler. D and Sillanpaa. M (1997)

---

[1] By now classic examples include Shell and BP, re-inventing themselves as energy suppliers rather than oil companies.
[2] The figure includes as well the production phase, and here environmental improvements come from principles concerning clean production rather than design activities.

There has been much discussion of the need for innovative products and services that can achieve 'Factor X' improvements in environmental performance, and also be compatible with the social objectives of sustainable development. However, as Project SIGMA (www.projectsigma.co.uk), a research study conducted by the European Scientific and Technical Observatory (Tukker et al, 2000) and other initiatives seeking to create sustainable business have found, there is a dearth of practical tools which can assist business developers, designers, researchers and others to integrate sustainability into innovation processes and to generate the creativity which is needed to drive radical improvements in products and services. As mentioned previously, the few which exist - for example, the Philips STRETCH approach, the Dow eco-compass and MBDC protocol - have not been widely applied. This is either because they have not been widely disseminated, are limited by the specific applications or circumstances for which they were developed and/or have been found wanting in practice. A further limitation is that existing innovation tools have focused on the environmental (and, to a much lesser extent, social) performance of products. There is a need to enable companies to more easily identify, evaluate and implement opportunities for sustainable products and services, especially those which are compatible with 'Factor X' criteria e.g. develop a structured sustainable innovation process and disseminate the results through workbooks and software

---

**P&G and sustainability**

We will provide products and services of superior quality and value that improve the lives of the world's consumers. As a result, consumers will reward us with leadership sales, profit and value creation, allowing our people, our shareholders, and the communities in which we live and work to prosper.

Major impacts associated with products

Environment
• Resource use (materials, energy)
• Water
• Waste and emissions

Social equity
• Health
• Hygiene
• Education

Economic development
• Shareholder value
• Employment
• Taxes, fees and contributions

Source: Corporate Sustainable Development, P&G 2000 Sustainability report

---

## Management implications

There is a need to explore the appropriate organisational structures to deliver *sustainable value*. To enable this will require different types of organisational networks and cross-company partnerships coupled with more systematic knowledge, learning and development strategies. To create higher levels of *sustainable value* it will be essential to define who are the best people to direct and manage the process, what are the appropriate skills that are needed to enable the creation of *sustainable value* – will they have to be *grown* internally or are there sources of expertise externally. To be successful the development of *sustainable solutions* will need to be linked to overall management and Sustainable Management Systems (www.projectsigma.co.uk). Dutch experiences in the nineties indicated that eco-design projects often tended to be 'one-offs' and companies often returned to 'business as usual' (Tukker et al, 2000). The key is the linkage to management systems. The Dutch are now working on the concept of Product-Orientated Environmental Management Systems (POEMS). Therefore Sustainable Management Systems will need take careful consideration of solutions development (product, service and PSS) – if it is to ensure the effectiveness of the process. Lessons can be learnt from ISO14062 – guidelines on integrating environmental considerations into product development – however this explicitly does not deal with sustainable development and services (Charter. M, Clark. T 2002). A key issue will be the analysis of sustainability lifecycle of the product, service or PSS. There will need to be a multi-functional approach bringing in both internal and external stakeholders. This will require new organisational structures, communications, education and training. The ability to improve net *sustainable value* will be different for each organisation and strategies to increase net *sustainable value* will need to

be put into carefully into place to achieve continuous improvement – this is likely to be a long process, as cultural change does not happen overnight.

### References

- Adkins S, 1999, Cause-related marketing: who cares wins, Oxford: UK, Butterworth
- Charter M & Clark T, 2002. 'Sustainable Value', Charter M & Clark T, Greenleaf Publishing, Sheffield:UK [1-874719-51-9]
- Charter M & Tischner U 2001. 'Sustainable Solutions' , Greenleaf Publishing, Sheffield:UK, [ISBN 1-874719-36-5]
- Charter M & Belmane I, 2000. Eco-design training and employment, report for DG Environment (EC), CfSD, Farnham:UK.
- Charter M, Kielkiewicz-Young A, Young A and Hughes A, 2001. Supply chain strategy and evaluation I & II, Project SIGMA, London: UK, (downloadable via www.projectsigma.com)
- Charter M & Clark T, 2002. Sustainable Value. Greenleaf Publishing, Sheffield, UK
- Charter M & Tischner U, 2001. Sustainable Solutions. Greenleaf Publishing, Sheffield, UK
- Cowe R and Williams S quoted in Draper, S, 2000. p7, Corporate Nirvana - is the future socially responsible?, London:UK, Industrial Society
- Cramer, J.M., W.J.V. Vermeulen and M.T.J. Kok, 1994. Met beleid naar milieugerichte productontwikkeling. NOTA, The Hague, the Netherlands
- Cramer, J.M. 1997. Environmental Management: From 'Fit' to 'Stretch'. Abridged version of the inaugural address given at the acceptance of the position of Professor of Environmental Management at the Catholic University of Brabant, 11 April 1997. Dutch version: Jan van Arkel Publishers, Utrecht, the Netherlands. English version: TNO Report 97/45, TNO-STB, Delft, the Netherlands
- De Bruijn, Th. & Tukker A, 2002. Partnership and Leadership: Building Alliances for a Sustainable Future. Kluwer Academic Publishers, Dordrecht/Boston/London
- Elkington, J. 1998. Cannibals with Forks. Capstone Publishing, Oxford, UK
- Ernst & Young and SPRU 1998. European Commission, DG XI: Integrated Product Policy. EU, DGXI,Brussels, Belgium, March 1998. Available from: http://europa.eu.int/comm/environment/ipp/ippsum.pdf
- EU 1998, Integrated Product Policy, report of a workshop held on 8 December in Brussels, Belgium. See internet: europa.eu.int
- EU 2001, White Paper on Integrated Product Policy. EU DG ENV., Brussels, Belgium. Available from http://europa.eu.int
- Fussler, C., with P. James 1996. Driving Eco-innovation. Pittman Publishing, UK
- Geels, F. and R. Kemp 2000. Transities vanuit Socio-Technisch Perspectief (Transitions from a Socio-Technical Perspective). University of Twente, Enschede, and MERIT, Maastricht, the Netherlands
- Kemp, R. (1995). Environmental Policy and Technical Change. A comparison of the Technological Impact of Policy Instruments. Ph.D. Thesis, Maastricht University, the Netherlands
- Kemp V. 'To whose profit: building a business case for sustainability', WWF-UK, Godalming:UK, ISBN 1 85850 190 3
- Klostermann, J.E.M. and A. Tukker (1998, eds.), Product Innovation and Eco-efficiency, Kluwer Academic Publishers, Dordrecht/London/Boston
- RAND (1997). Technologieradar. RAND Europe for the Dutch Ministry of Economic Affairs, the Hague, the Netherlands.
- Rotmans, J. (ed. 2000). Transitions and transition management. ICES/MERIT/TUE, Maastricht/Eindhoven
- SustainAbility, 2001. Buried Treasure: Uncovering the Business Case for Corporate Sustainability, London: UK
- Tukker, A., E. Haag, P. Eder, A. Vercalsteren, Th. Wiedmann U. Tischner, M. Charter, I Belmane, G. Timmers, M. van der Vlugt (2000). Ecodesign: European State of the Art. Part I and Part II. Part I: IPTS report…, IPTS, Seville, Spain (60 p.). Part II: downloadable via www.jrc.es (400 p.)

- Tukker A, Haag E and Eder P 2000. Eco-design: strategies for dissemination for SMEs, Part I: Overall analysis and conclusions, European Science and Technology Observatory (ESTO) project report, Joint Research Council-Institute for Prospective Technological Studies for DG Environment (EC), Seville:Spain, October 2000 (downloadable via ftp://ftp.jrc.es/pub/EURdoc/) [EUR 19740 EN]
- Tukker A, Haag E and Eder P 2000. Eco-design: strategies for dissemination for SMEs, Part II, European Science and Technology Observatory (ESTO) project report, Joint Research Centre-Institute for Prospective Technological Studies for DG Environment (EC), Seville:Spain, (downloadable via ftp://ftp.jrc.es/pub/EURdoc/
- Tukker A, Haag E and Eder P 2000. Eco-design: European State of the Art, Part I: Comparative analysis and conclusions, European Science and Technology Observatory (ESTO) project report, Joint Research Centre-Institute for Prospective Technological Studies for DG Environment (EC), Seville:Spain, (downloadable via ftp://ftp.jrc.es/pub/EURdoc/) [EUR 19583 EN]
- Tukker A, Haag E and Eder P 2000. Eco-design: European State of the Art, Part II, European Science and Technology Observatory (ESTO) project report, Joint Research Centre-Institute for Prospective Technological Studies for DG Environment (EC), Seville:Spain, (downloadable via ftp://ftp.jrc.es/pub/EURdoc/)
- Weterings, R., and H. Opschoor (1992). Environmental Space as a Challenge for Technology Development. RMNO, Rijswijk, the Netherlands
- WBCSD (1999), Sustainability through the market. Executive Brief, February 1999. World Business Council for Sustainable Development, Geneva, Switzerland
- Wheeler D, Sillanpaa M, 1997. The Stakeholder Corporation, Pitman Publishing, London: UK, 1997 (ISBN 0273 62661 2), p255)
- Zadek S, 2001, Doing good and doing well: making the business case for corporate citizenship, New York: US, Conference Board