Eco-efficient Value Creation,
sustainable strategies for the
circular economy

The cover photo is the Endeavour, a J-class ship originally built in 1934 for the America's Cup. The ship has been restored by Royal Huisman in The Netherlands.
The ships of Royal Huisman are extreme examples of eco-efficient value creation: unique custom build yachts, exceeding all expectations. These classic and modern yachts have such a high quality that they are expected to last well over 100 years, kept in an excellent condition by good maintenance.
Sailing boats in general have a very low eco-costs/value ratio. They combine low eco-burden with a high value for the ship owner and the passengers.

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Eco-efficient Value Creation, sustainable strategies for the circular economy

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Preface

"The ever growing economy seems to be one of the major root-causes of the continuing deterioration of our environment. The question is: what can be done? Stopping the economic growth around the globe seems no realistic option, so the solution must be found in a better eco-efficiency of our systems for production and consumption (decoupling of economy and ecology). Future products and services need to have a high Value/Costs Ratio combined with a low burden for our environment. This is the challenge for modern designers, engineers, business managers and governmental leaders." This quotation was the start of the preface of my book "LCA-based assessment of sustainability: the Eco-costs/Value Ratio (EVR)" [1].

Most people who got acquainted with the EVR since its introduction in 1999, realized that the two dimensional approach of this model is a powerful way to design 'green' products and services ('eco-efficient value creation') and to determine a sustainable product portfolio strategy. However, it appeared that the 'translation' of the theoretical concept of the abovementioned book to innovative solutions is often too difficult.
To bridge the gap between theory and practice, two issues are essential:

- a relative simple way to calculate the 'eco-costs' (by means of 'Fast Track' LCA)
- good understanding of the meaning of 'value' in the equation

When I realized that calculation of the eco-costs was a problem in practice, I decided to write the "Practical Guide to LCA" [2], starting with the common sense, and building on it with practical solutions for, sometimes, complex issues (like recycling). Together with the LCA DATA book [3], and with extra Excel look-up tables at the website www.ecocostsvalue.com, calculations on the eco-costs of products and services have become quite easy and can be done in hours rather than months.
The second issue (understanding the meaning of value), however, appeared to be another hurdle in the application and understanding of the EVR model. The concept of the Customer Perceived Value (which is "the fair price in the eyes of the customer", or, "the use and fun that is expected after the purchase") of the *individual customer* is important for a full understanding of the strategic design consequences which follow from the EVR. This book deals with this second issue, shows how to enhance value, and gives many practical examples of eco-efficient value creation.
The third issue is related to the quest for solutions in the so called "circular economy" [5]. The notion that materials in the "technosphere" must be recycled, and that materials from the "biosphere" provide new opportunities for innovations, is not new. New is, however, the focus on the *transition* from the old, linear, systems towards new, circular, systems. Essential for such a transition is that new business models must be developed to support the transition. These business models must have extra added value (in comparison to the competition in the market) combined with lower eco-

burden (less resource depletion as well as less environmental pollution).

This book is not about the general philosophy of the circular economy as such, but about the practical implementation of it. Literature on the general philosophy is abundantly available, but my experience is that most of the students at our University, and many entrepreneurs and business managers, struggle with the practical design and implementation of sustainable innovation. Key questions are: 'is my new system really better for the environment than the existing systems?' and 'how do I add extra value to cope with the extra costs?'. I realised that the two dimensional approach of the EVR model provides the key to these two questions, but that 'the devil is in the detail'. I also realised that design and implementation of the circular economy is not about magic solutions but about common sense. But common sense is often not common practice. To tackle this issue requires an open mind, free of dogmas. However, it requires also a profound knowledge of 'design for sustainability' and 'market value' of products and services.

The design of innovative circular business systems is a matter of Eco-efficient Value Creation. This book is a comprehensive description how to accomplish that. The book starts with underlying principles and simple examples on products, gradually exploring more complex systems like regional Product Service Systems. Finally the book gives advice on corporate marketing and communications, supply chain management and investment strategies.

My hope is that this book will not only be used by students, but also by designers, architects, and business managers (and their consultants), since they all need a practical guide to assess and improve the sustainability of their innovative ideas.

Delft University of Technology, the Netherlands, September 2014
Joost G. Vogtländer

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1 Introduction

1.1 A mission to accomplish

In November 1993, the World Council for Sustainable Development, WBCSD, defined a general mission statement for their member companies. See Fig. 1.1.

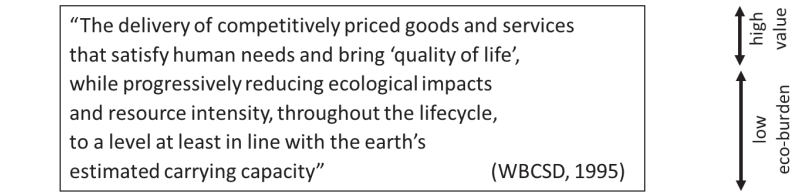

Figure 1.1

The mission to accomplish: two mission statements

This business oriented definition of the WCDB links two aspects of good governance:

- modern management practice ("the delivery of competitively priced goods and services … quality of life")
- the need of a sustainable society ("while progressively reducing …… to …… earth's carrying capacity").

The first part of the sentence asks for a maximum Value/Costs Ratio of the business chain, the second part of the sentence requires that this is achieved at a minimum level of ecological impact.
But what does this rather philosophical definition mean to business managers, designers and engineers in terms of the practical decisions they take? There is a need to resolve simple questions like: what is the best product design in terms of ecological impact?, what is the best product portfolio in terms of sustainability?, what is the best sustainable strategy?

It is now widely recognised by economists that the goal of sustainable development is principally an equity issue. Sustainable development is a requirement to manage the resource base, so that the average quality of life we ensure ourselves can potentially be

shared by all future generations. High levels of eco-efficiency of product-service systems are required to achieve such an 'intergenerational equity'.
However, there is also the awkward question of the equity within our own generation: the 'intragenerational equity', which is related to the sustainability issues with regard to the poor countries of our world.

The need for a better organised economy, decoupling the economic growth and the environmental degradation, was expressed for the first time in the Brundtland Report "Our Common Future" (1987, Preface, page xii), as the conclusion of a study on the situation in the developing countries:
"The downward spiral of poverty and environmental degradation is waste of opportunities and of resources. In particular it is a waste of human resources. These links between poverty, inequality and environmental degradation formed a major theme in our analysis and recommendations. *What is needed now is a new era of economic growth - growth that is forceful and at the same time socially and environmentally sustainable.*"
This statement is fully in line with the famous definition of sustainable development in this report (page 43): "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".
Both statements underline the need for eco-efficient value creation in a circular economy.

1.2 The Triple-P model

In line with the way of reasoning of the previous section, sustainability is often described in terms of the Triple-P model.
The term Triple-P is related to the aim of companies, and therefore it is related as well to the design of products and services. It refers to the concept of the "triple bottom line" as formulated by John Elkington in his book Cannibals with Forks. See Fig. 1.2.

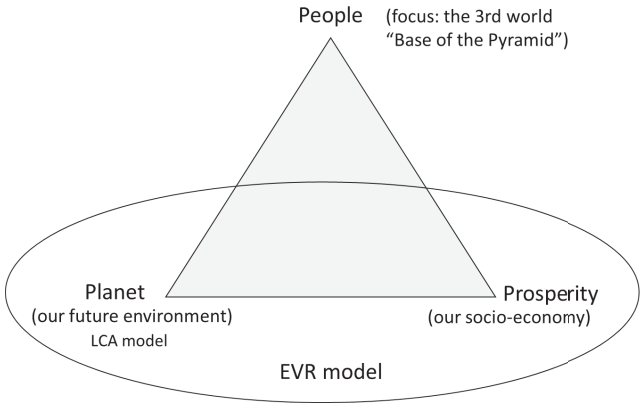

Figure 1.2

The Triple-P model for sustainability and its relationship with LCA and the EVR model