

DESIGNING INTEGRATED QUALITY: INNOVATION, PRODUCT LIFECYCLE AND CERTIFICATION SYSTEMS



Inaugural Lecture, Linz, Austria, 25.04.2016

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Institute for Integrated Quality Design



JOHANNES KEPLER
UNIVERSITY LINZ

AGENDA

1. Introduction

2. Framing Integrated Quality Design

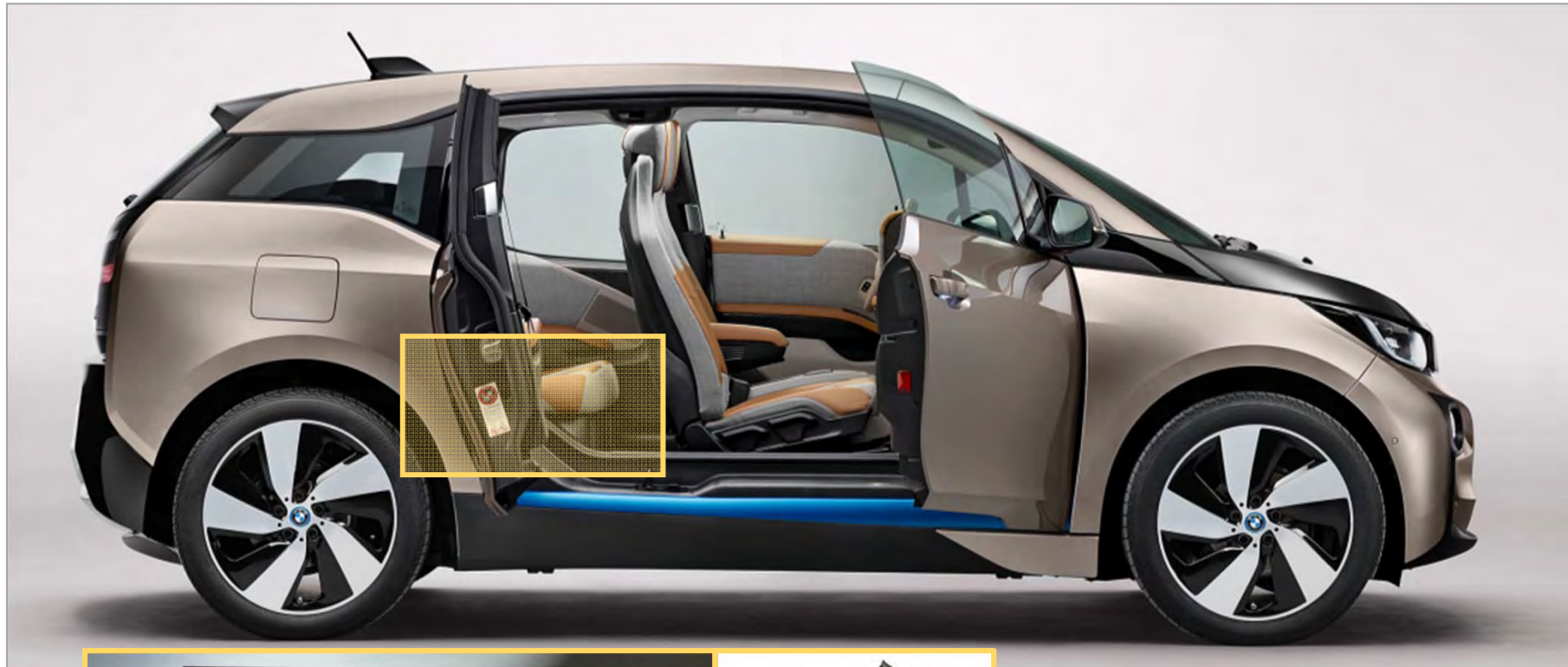
i. Quality by Design

ii. Integration and life-cycle orientation

iii. Supporting role of (certified) management systems

3. Research fields and future research

INTEGRATED QUALITY: BMW i3



Design philosophy

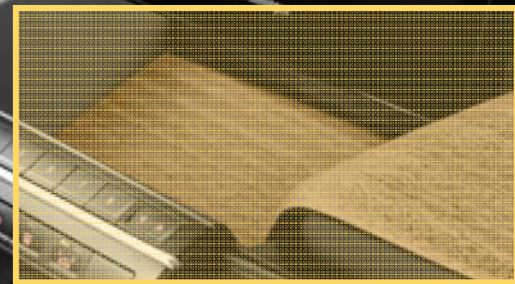


Image 3 of 3

The design of the BMW i3.

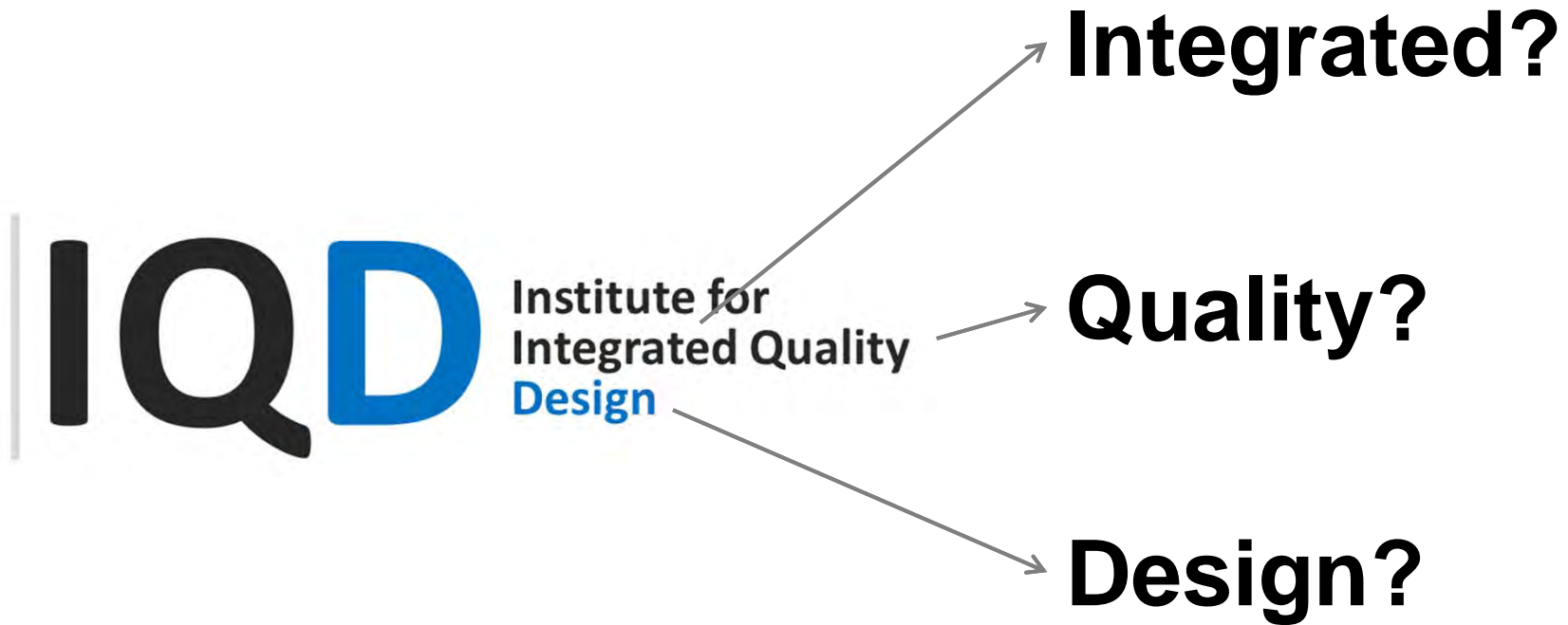
Premium quality with convincing sustainability. And inspiring.

> View film

BMW i stands for a visionary automobile and a new understanding of premium mobility characterised by a consistent alignment towards sustainability. The inspiring, future-orientated design of the BMW i vehicles makes this something to be experienced in all its facets. It authentically visualises the innovative technology of the vehicles and transfers values such as lightness and sustainability to the BMW i3.

Wo kommt's her und wo geht's hin?

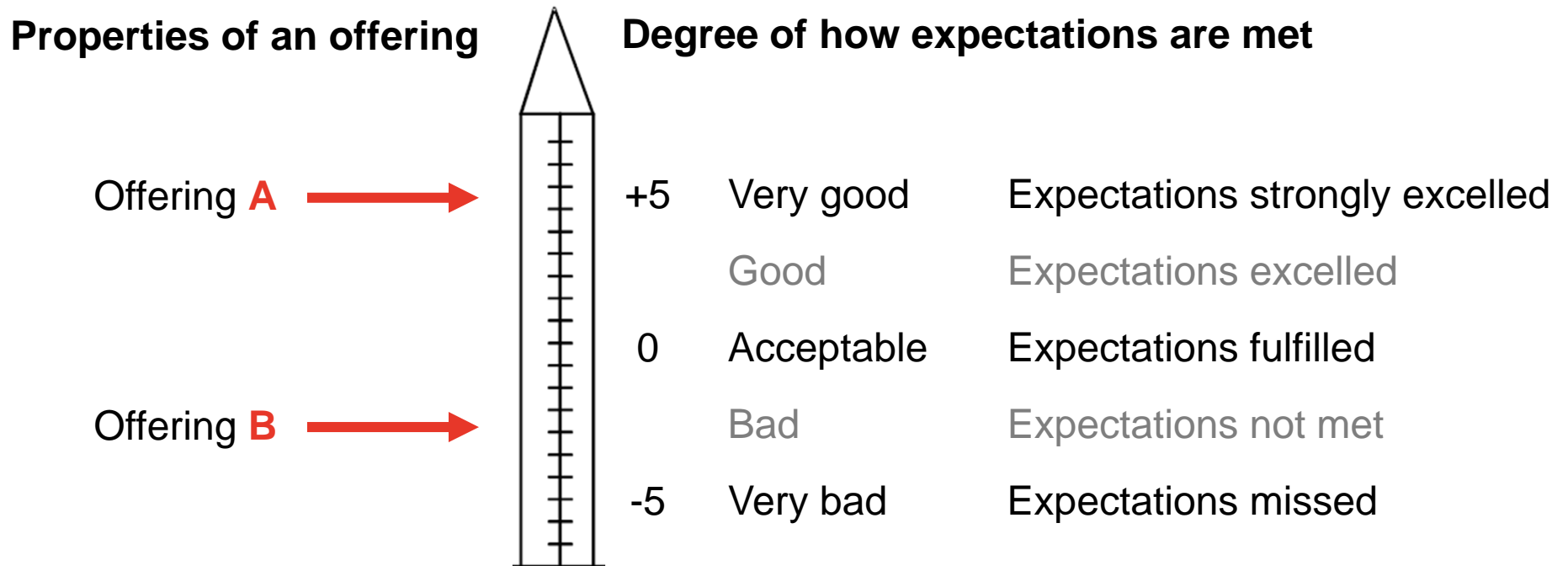
IQD: BREAKING IT DOWN



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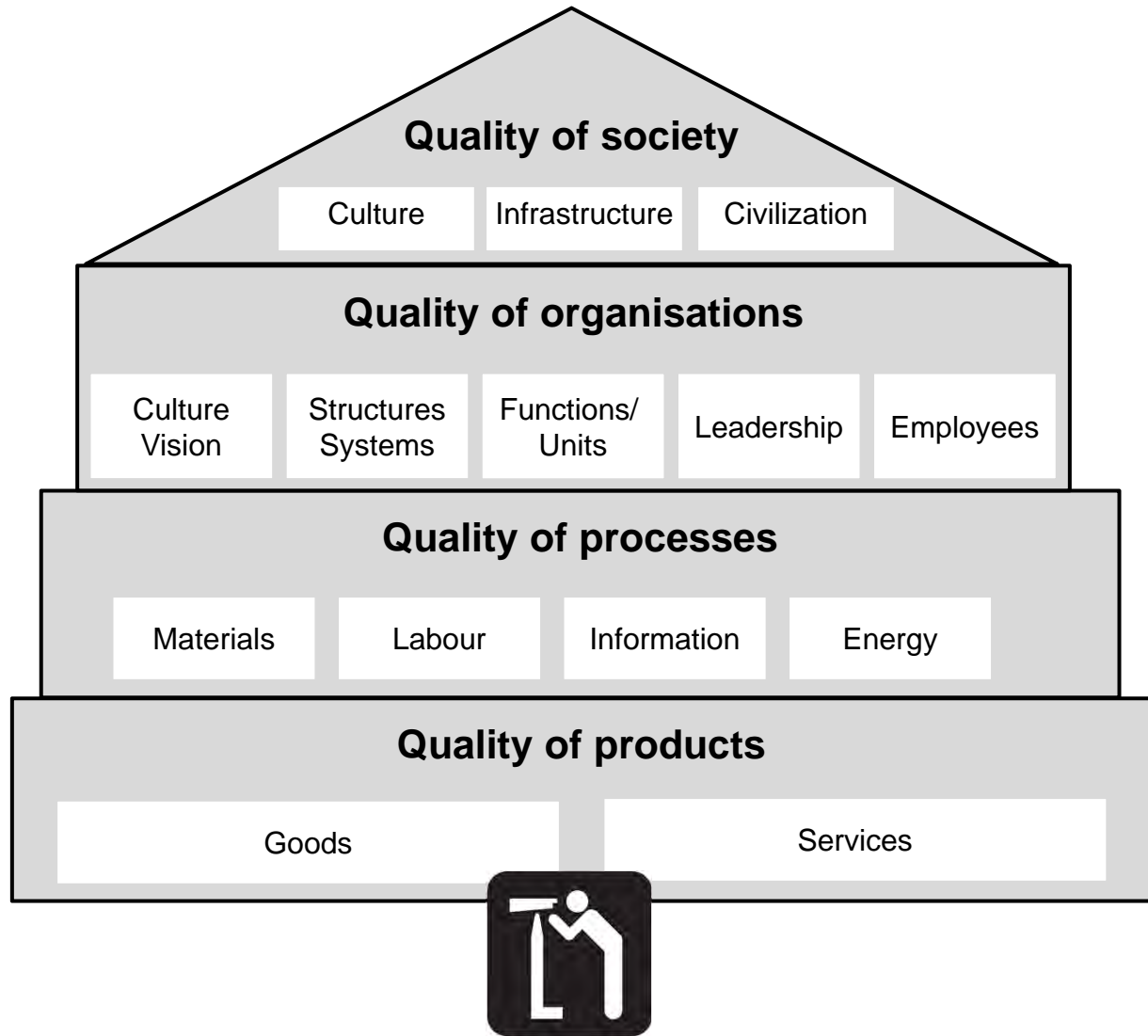
QUALITY IN A NUTSHELL



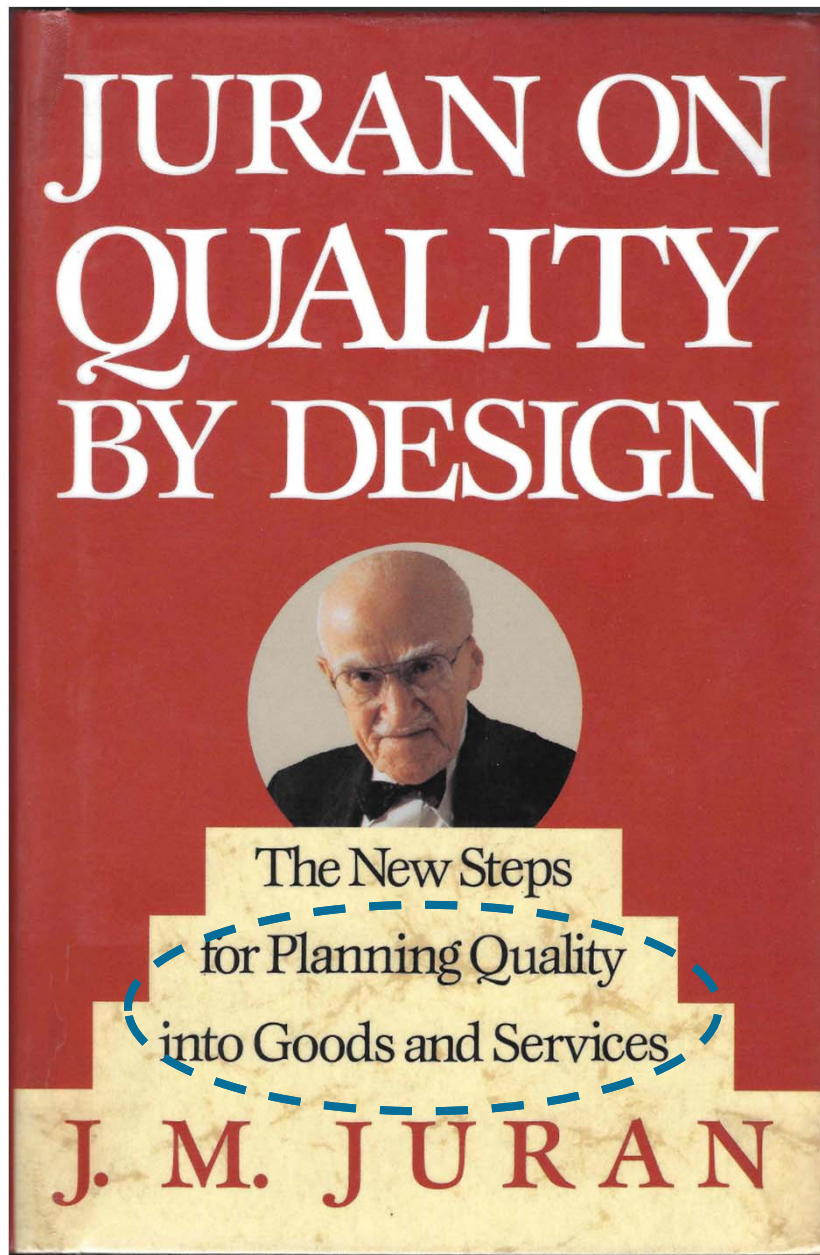
Quality = relative to expectations

Source: based on Seghezzi et al. 2007, p.35

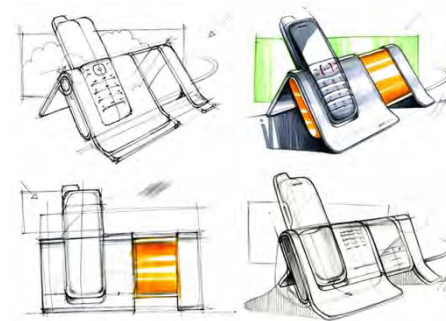
QUALITY HIERARCHY



Source: based on Seghezzi et al. 2007, p.7

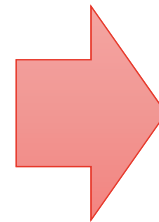


FROM INSPECTION TO INNOVATION



Inspected-in Quality

Q control
of manufactured good

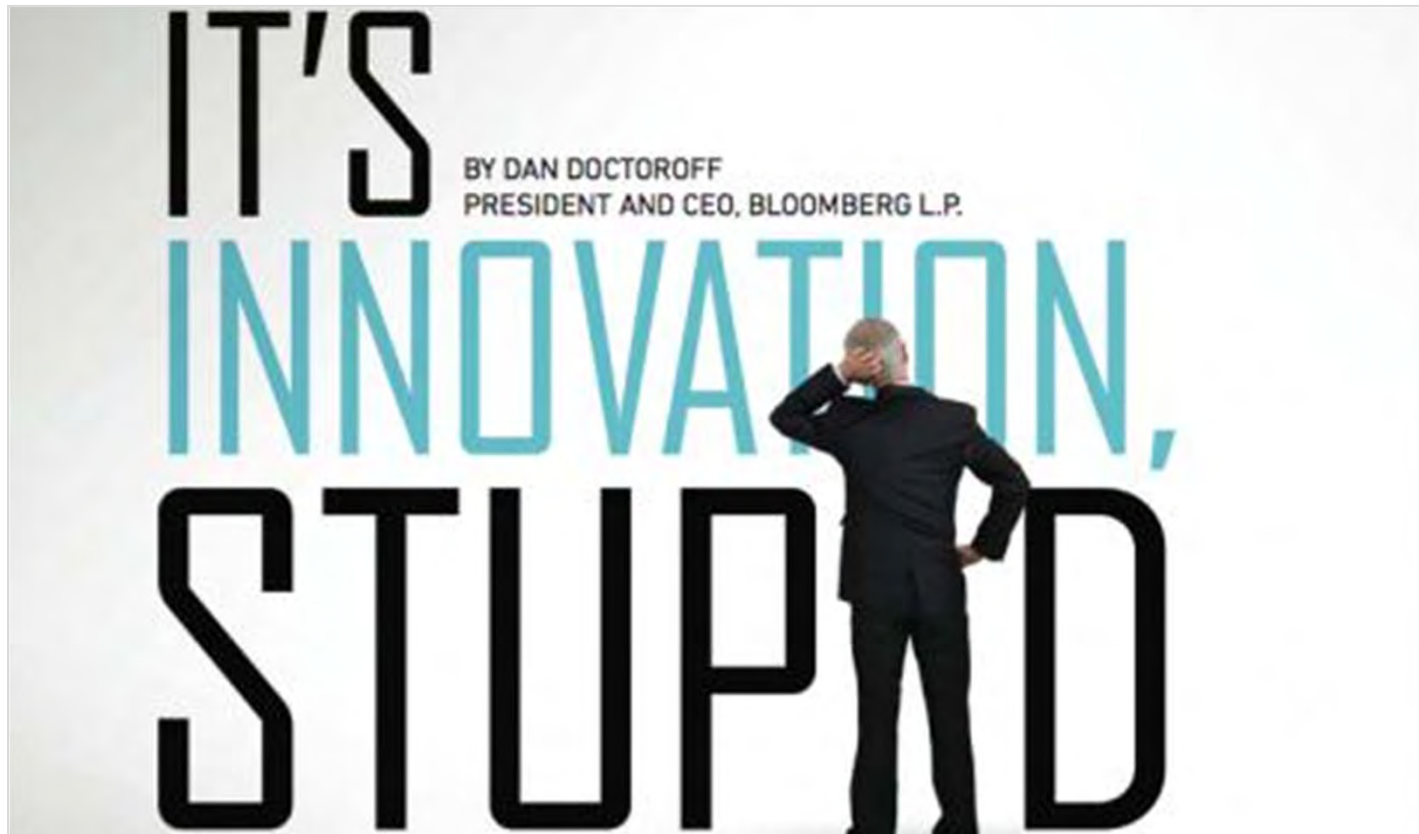


Designed-in Quality

Q as part of
product development

Source: based on Chan & Wu 2002; Juran 1992

Image source: https://www.pinterest.com/pin/402509285416113854/?from_navigate=true8 (21.4.2016)

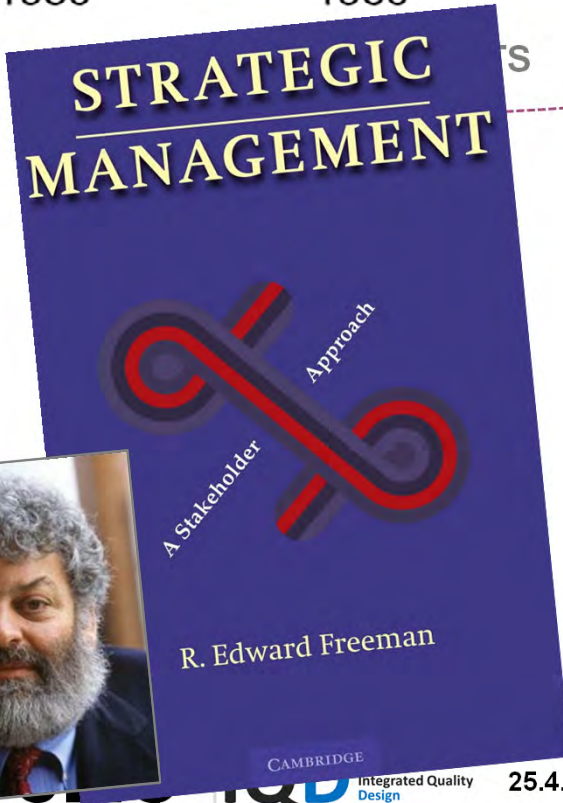
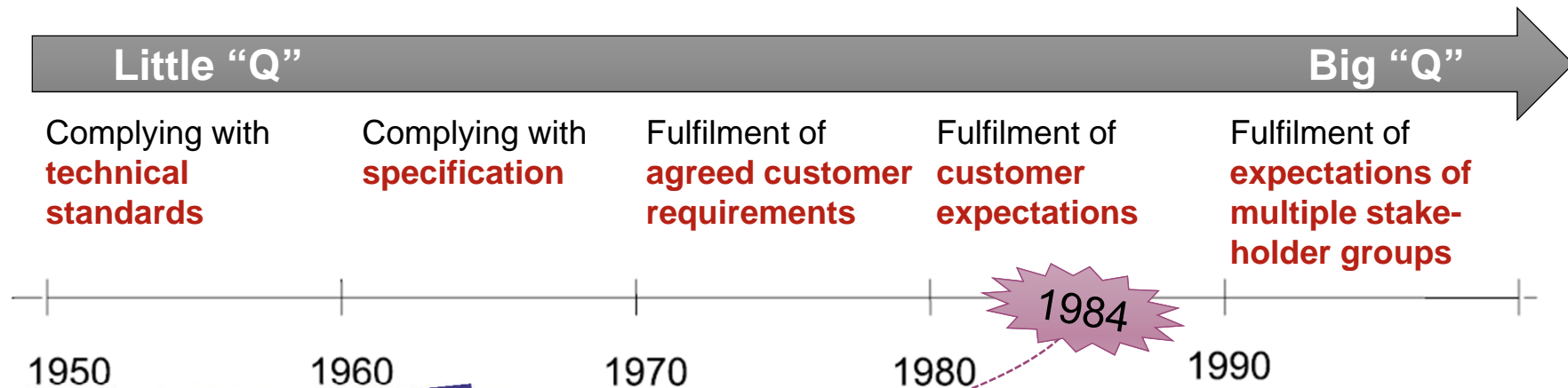


Source: <https://www.uschamberfoundation.org/bhq/its-innovation-stupid> (21.4.2016)

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THE MEANING OF QUALITY OVER TIME



Quality of a unit is measured against the expectations of relevant stakeholders



Prof. Yoshinori Iizuka
(as cited in Joiner 2012, p.6)


Source: based on Seghezzi et al. 2007, p. 35

*“Quality thus relates to **all** who have needs and expectations related to the product or service **including society, employees, suppliers, and investors**. In this sense, ‘sustainability’ is a part of quality of product, and I thus think we need to **expand the definition of quality to include negative externalities as ‘defects.’**”*

STAKEHOLDER ORIENTATION → NEW Q DIMENSIONS

Improvement in the New Millennium

Quality, Sustainability, and Externalities




Brian L. Joiner

Brian Joiner is author of Fourth Generation Management, coauthor of The Team Handbook, and founding editor of ... He is the founder and CEO

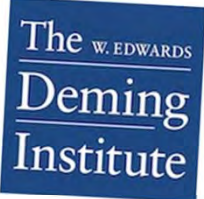
2011 Forces of Change— Shaping the Future of Quality

What follows are the top eight forces that the panel determined are shaping the future of quality. The narratives paraphrase the perspectives of the panel relating to each force. If you're interested in how the forces of change have evolved over time, see page 32.

1. Global responsibility represents the blending of heightened awareness of the requirement to become more socially responsible with a growing awareness of the global impact of local decisions. Our planet's finite resources are



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The W. Edwards Deming Institute Blog

Approaching Sustainability Using Deming's Thinking

by [John Hunter](#) March 24, 2014

Approaching Sustainability Using Deming's Thinking

EXECUTIVE BRIEF

CSR and Quality:

A Powerful and Untapped Connection



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CORPORATE SUSTAINABILITY INITIATIVES: THE NEXT TQM?

Understanding emerging corporate sustainability practices through the lens of total quality management

By Shelly F. Fust & Lisa L. Walker


EXECUTIVE INSIGHT



Institute for Integrated Quality Design

Cradle to Cradle for Innovation and Quality


"The C2C Chair is the centre point of n professorships, which combines educat and research in Design, Architecture & Engineering with Business & Innovatio



CERTIFIED
cradletoCradle

REDEFINING PRODUCT QUALITY

CRADLE TO CRADLE CERTIFIED™



EXAMPLE: DIESEL AND STAKEHOLDERS

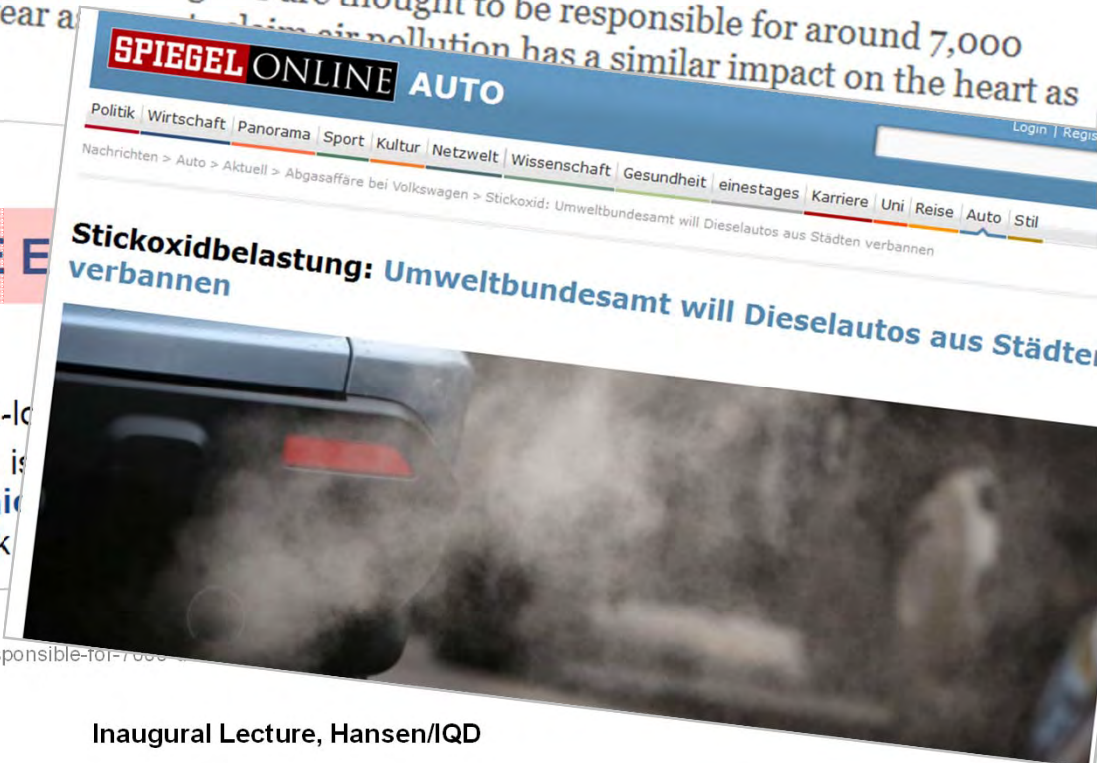
International Agency for R



World Health Organization

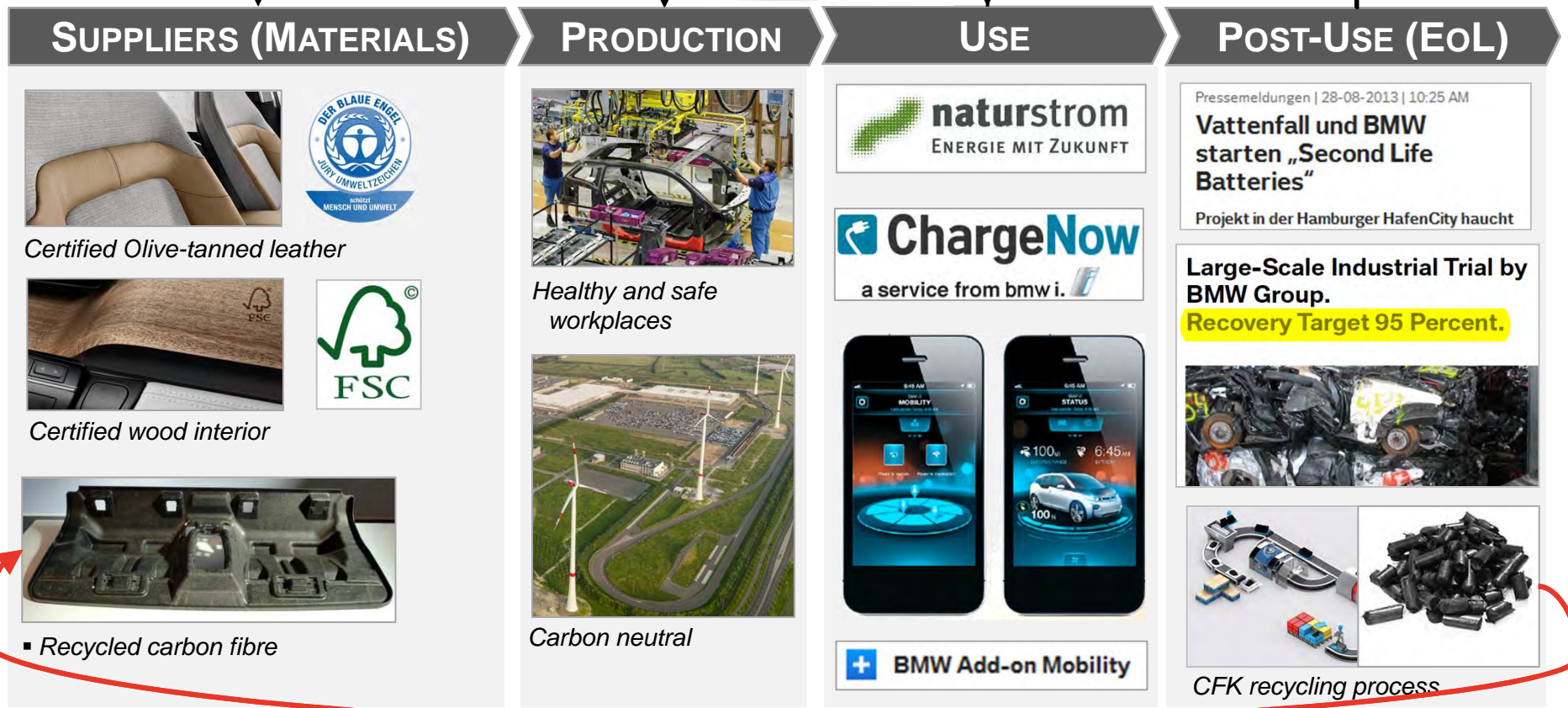
IARC: DIESEL ENGINE E

Lyon, France, June 12, 2012 -- After a week-l
Agency for Research on Cancer (IARC), which is
classified diesel engine exhaust as **carcinogenic**
that exposure is associated with an increased risk



Sources: International Agency for Research on Cancer (IARC) (2012); <http://www.telegraph.co.uk/news/earth/environment/10796035/Diesel-engines-responsible-for-7000-deaths-a-year/>; www.spiegel.de (17.1.2016); for scientific evidence see also: Wise 2015

BMW i3: LIFE-CYCLE ORIENTATION



LIFECYCLE ORIENTATION IN THE STEEL INDUSTRY

Press release

October 6, 2014

voestalpine CEO Wolfgang Eder is new worldsteel Chairman

Wolfgang Eder, Chairman of the Management Board of the voestalpine Group, today became the first Austrian Chairman of worldsteel at the World Steel Association's Annual General Meeting. For one year he will lead one of the world's largest steel industry associations, with around 170 association members representing 85% of world steel production.



"I plan to focus on three major areas in my new role. They are the steel industry's contribution to

"It will be increasingly hard to maintain traditional mass steel production ... in the mature economies. [...] We need to develop a long-term plan for encouraging a traditional steel industry, still strongly driven by volume, to increasingly focus on quality."

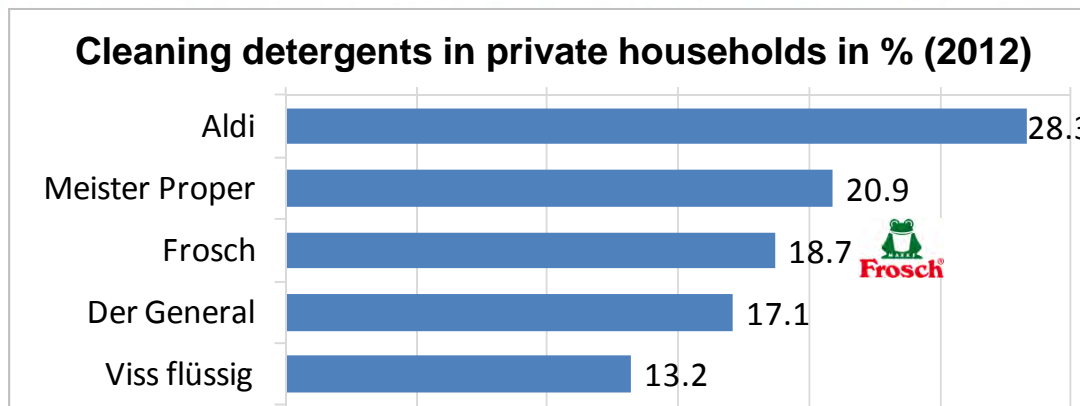
And applications, and value chains, starting with the raw material, its production, use, and subsequent recycling. "When it comes to life cycle, steel has undeniable advantages compared to all other

"Another focus is life cycle assessment; the integrated approach to material developments, applications, and value chains, starting with the raw material, its production, use, and subsequent recycling."

It will economies. "Over the long term, high cost regions will hardly remain competitive. We need to develop a long-term plan for encouraging a traditional steel industry, still strongly driven by volume, to increasingly focus on quality. Quality not quantity must be the motto, especially in industrialized countries."

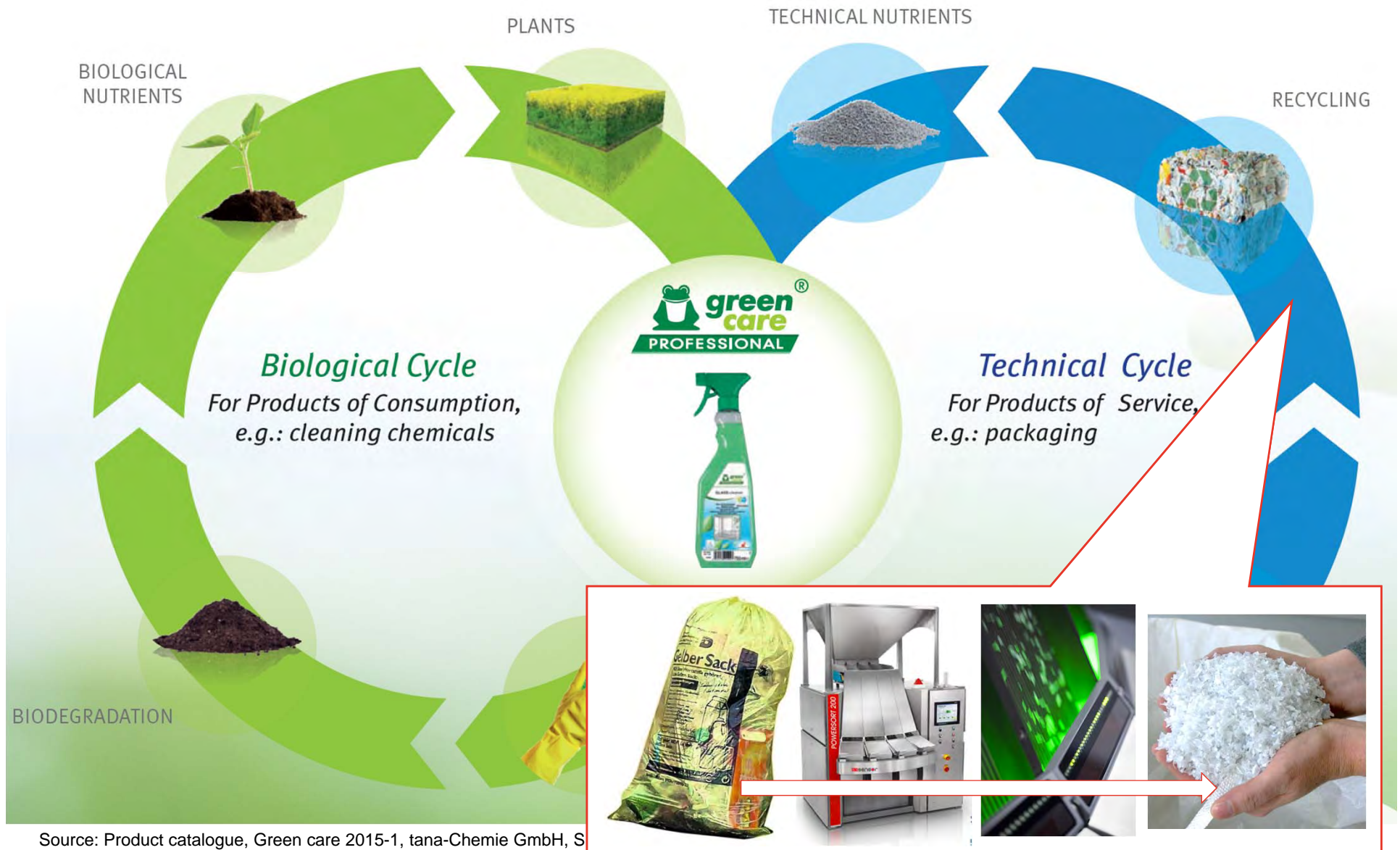
Source: <https://www.voestalpine.com/group/en/press/press-releases/2014-10-06-voestalpine-ceo-wolfgang-eder-is-new-worldsteel-chairman.html> (18.8.2015)

CIRCULAR PRODUCTS @FROSCH BRAND



Sources: Werner & Mertz Gruppe (2013), p.7; statista (2013)

CIRCULAR PRODUCTS @FROSCH BRAND

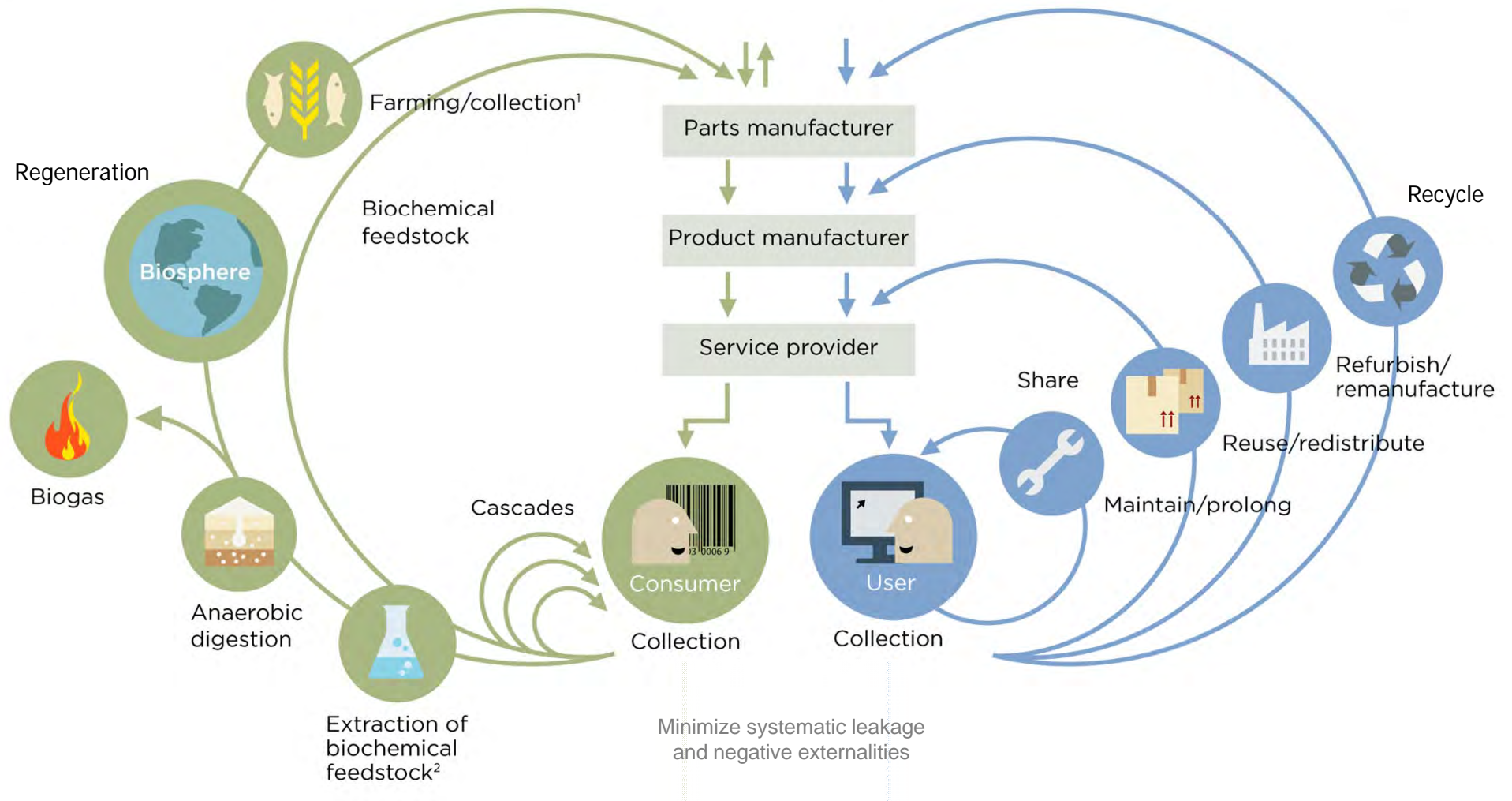


Source: Product catalogue, Green care 2015-1, tana-Chemie GmbH, S

THE CIRCULAR ECONOMY IN DETAIL

Renewables flow management

Stock management




Source: based on Ellen MacArthur Foundation, 2012, p. 24

CIRCULARITY, QUALITY ASSURANCE AND CONSUMER HEALTH

MINERALÖLE IN LEBENSMITTELN 10/2015


F



CORNFLAKES

	Kellogg's Corn Flakes	Pétales de maïs sucrés (Carrefour)	Chabrior Corn Flakes (Intermarché)	Recyclingfaser
Mindesthaltbarkeitsdatum	13/05/2016	21/02/2016	07/05/2016	
Verpackungsmaterial**	Recyclingfaser	Recyclingfaser	Recyclingfaser	Recyclingfaser
IN DER VERPACKUNG				
Gesättigte Mineralöle (MOSH) in mg/kg	257	409	383	242
Aromatische Mineralöle (MOAH) in mg/kg	41	159	128	91
IM LEBENSMITTEL				
Gesättigte Mineralöle (MOSH) in mg/kg	0,6	1,6	3,3	1,6
Aromatische Mineralöle (MOAH) in mg/kg	nicht nachweisbar	0,4	0,9	0,5

**Annahme basierend auf den in der Verpackung gefundenen Mengen an MOSH und MOAH (bei weniger als 175mg/kg MOSH und keinem oder nur äußerst geringem Nachweis von MOAH in der Verpackung wird angenommen, dass diese aus Frischfasern besteht).



Bundesinstitut für Risikobewertung

befinden sich hier: **Lebensmittelverpackungen aus Recyclingmaterialien müssen sicher sein**

15/2010, 03.11.2010

Neuntes BfR-Forum Verbraucherschutz beschäftigt sich mit **gesundheitlichen Risiken durch Recycling-Verpackungen**

Rund 300 T...

Neuer Woolrec-Skandal

Millionen belastete Ziegelsteine in Wohnhäusern verbaut

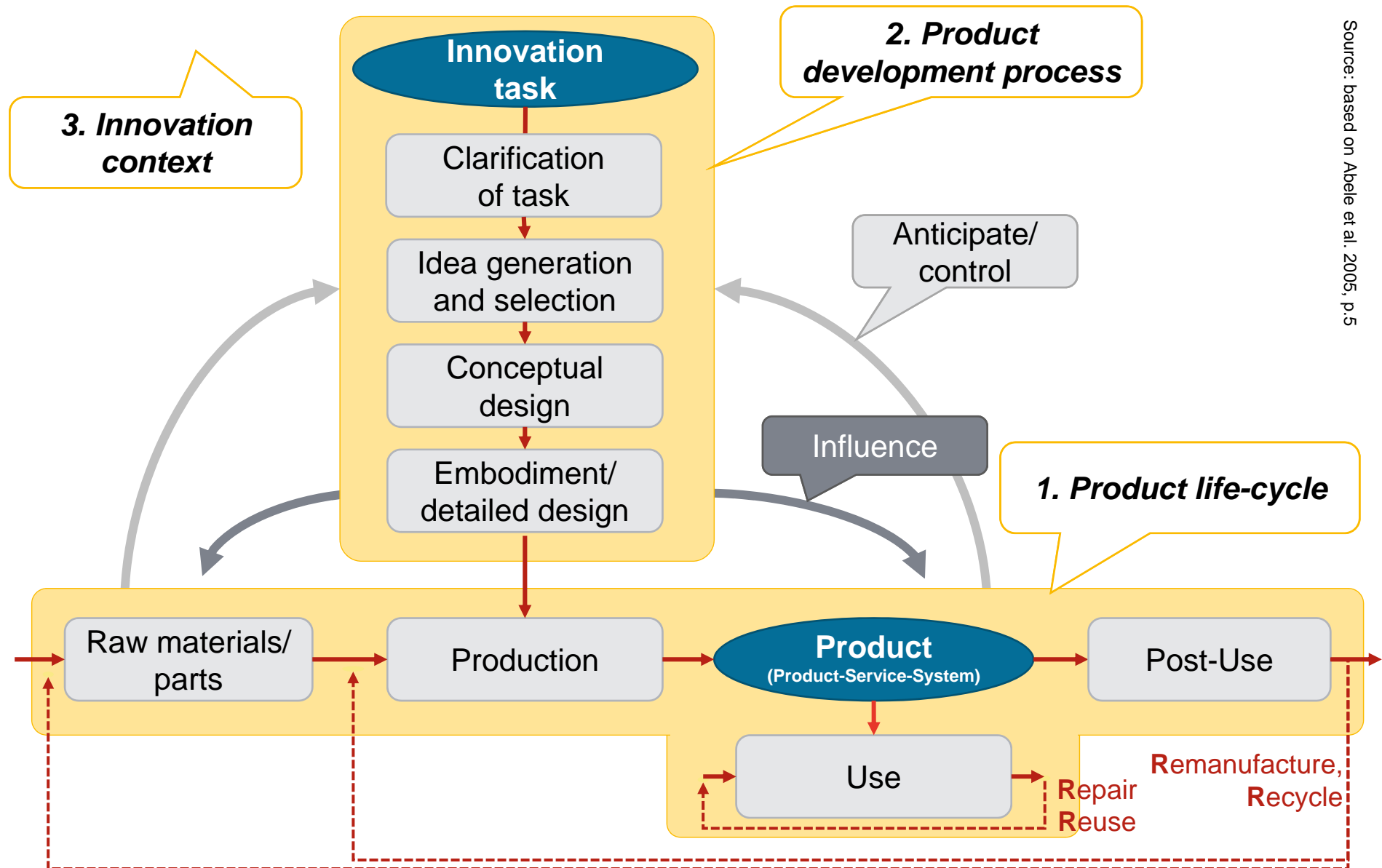
Veröffentlicht am 27.07.15 um 21:54 Uhr



Millionen Ziegelsteine enthalten giftiges Woolit. Bild © hr

Neue Erkenntnisse im Woolrec-Skandal: Nach hr-Recherchen sind Millionen Ziegelsteine zwischen 2004 und 2012 mit dem krebserzeugenden Material Woolit in Wohnhäusern eingebaut worden. Die von den Behörden mittlerweile geschlossene mittelhessische Firma ... Ziegelsteine in ganz Deutschland.

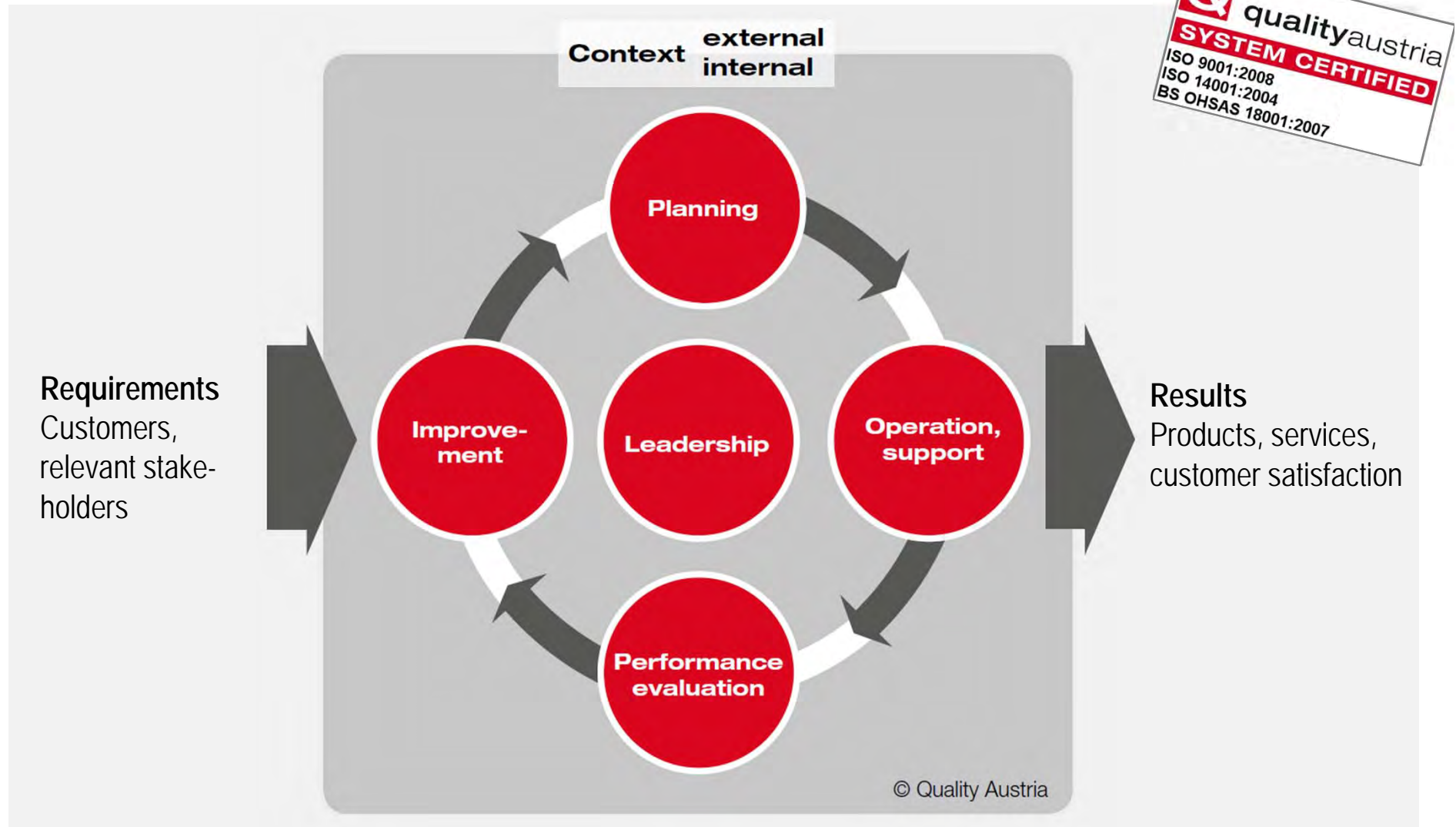
PRELIMINARY CONCLUSION I: LIFECYCLE-ORIENTED PRODUCT DEVELOPMENT



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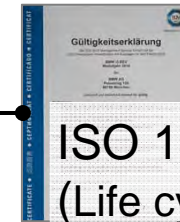
THE ORGANIZATION AS AN INTEGRATED MANAGEMENT SYSTEM



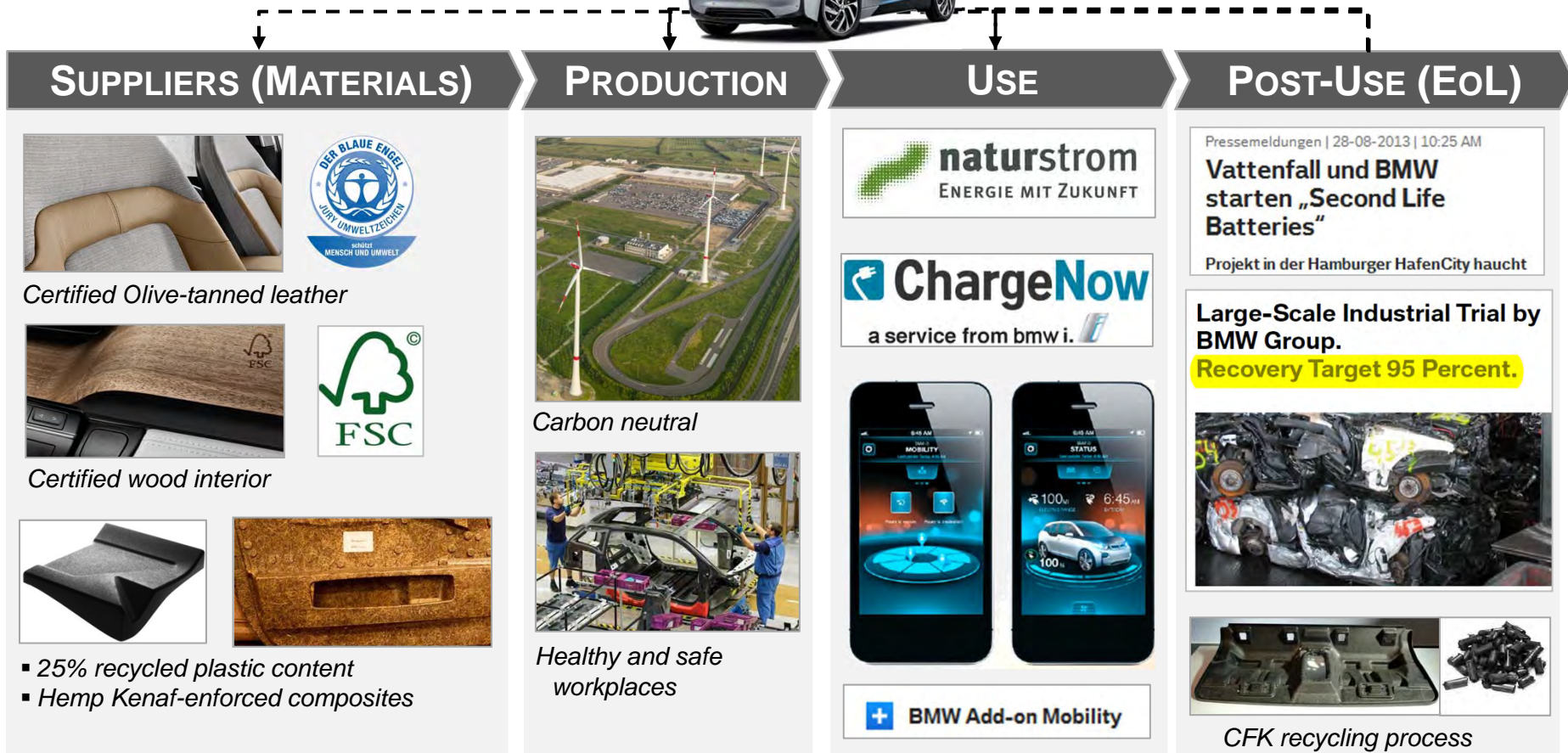
Source: based on Quality Austria (2016), p.4

INTEGRATED QUALITY: BMW i3

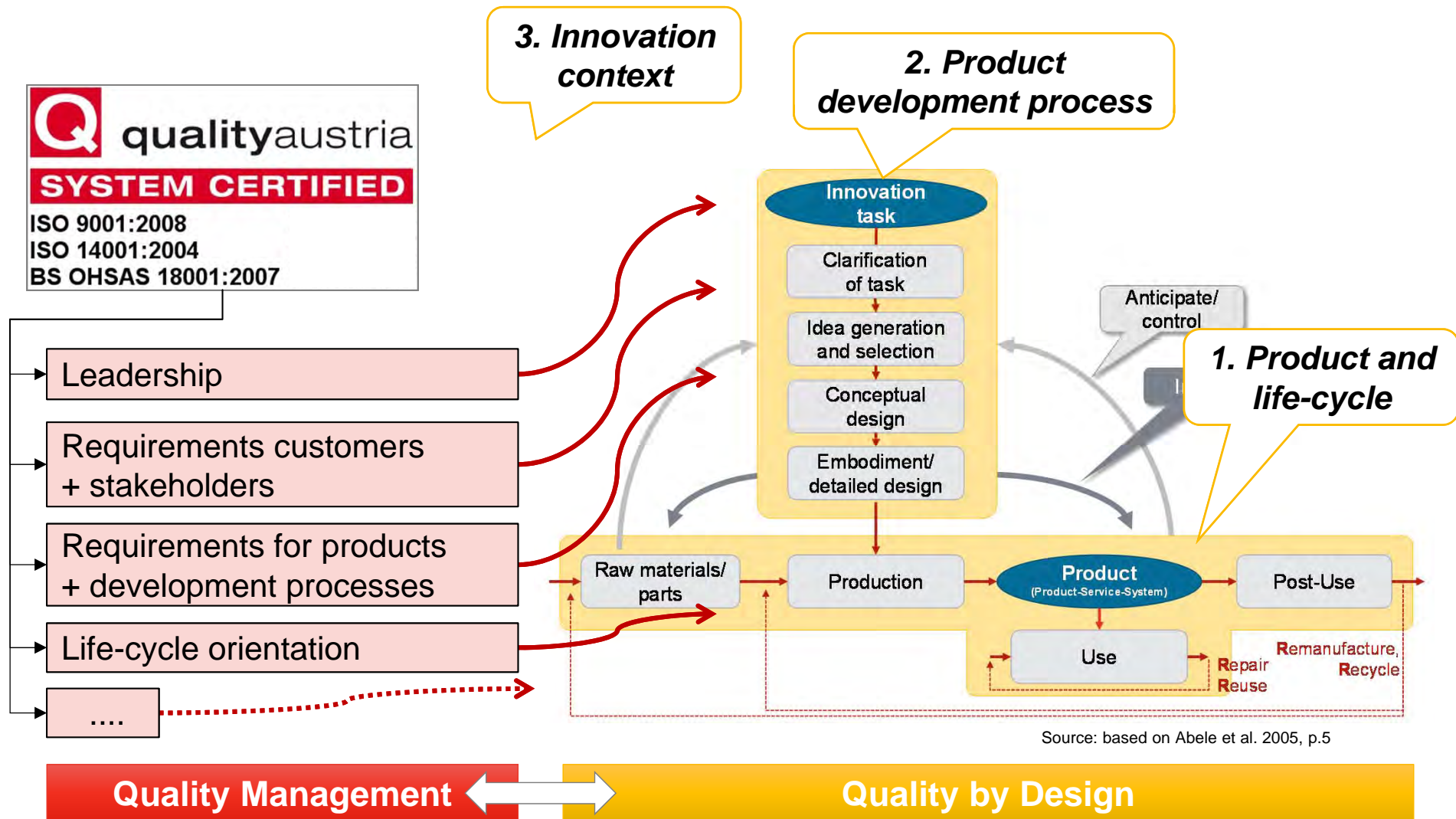
Integrated Management System
(ISO 9001, 14001, EFQM, ...)



ISO 14040
(Life cycle assessment)



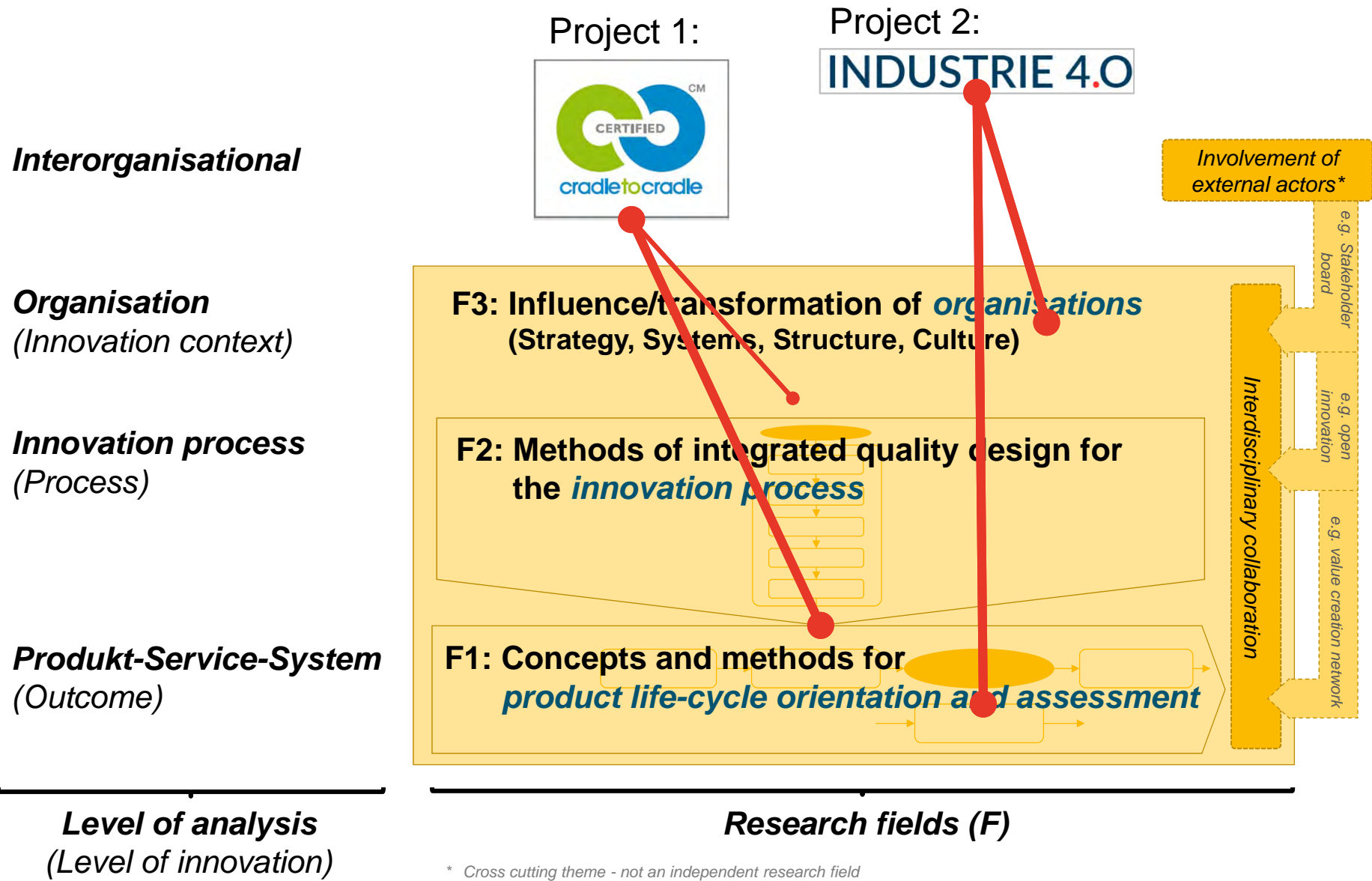
PRELIMINARY CONCLUSION II: QUALITY BY DESIGN MEETS QUALITY MANAGEMENT



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IQD RESEARCH FIELDS



* Cross cutting theme - not an independent research field



Berkeley UNIVERSITY OF CALIFORNIA Yale Imperial College London

Stanford TU Delft Delft University of Technology Technische Universität Berlin

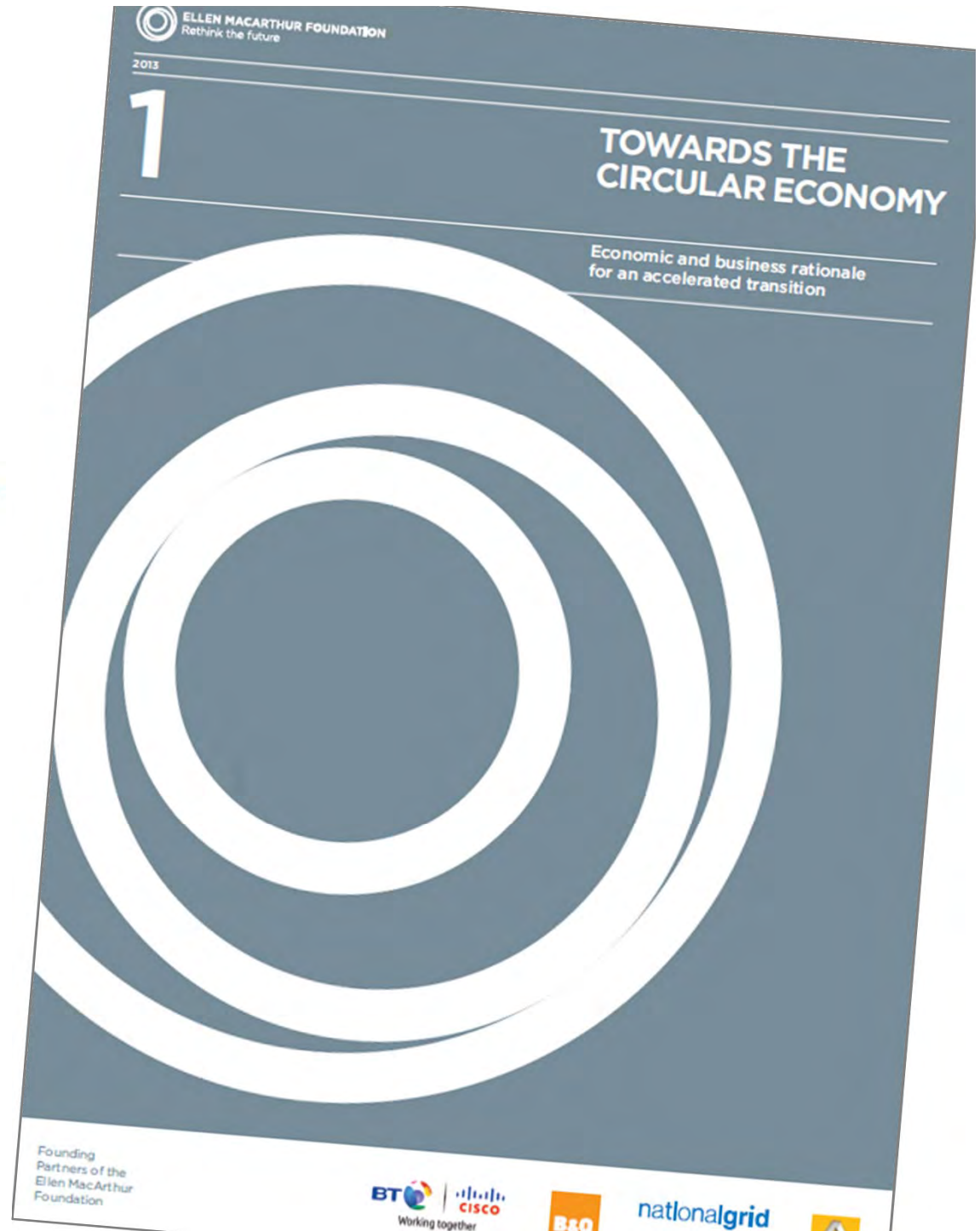
Cranfield UNIVERSITY MIT LEUPHANA UNIVERSITY OF LÜNEBURG

CISCO Google Unilever RENAULT

PHILIPS H&M Kingfisher

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25.4.2016



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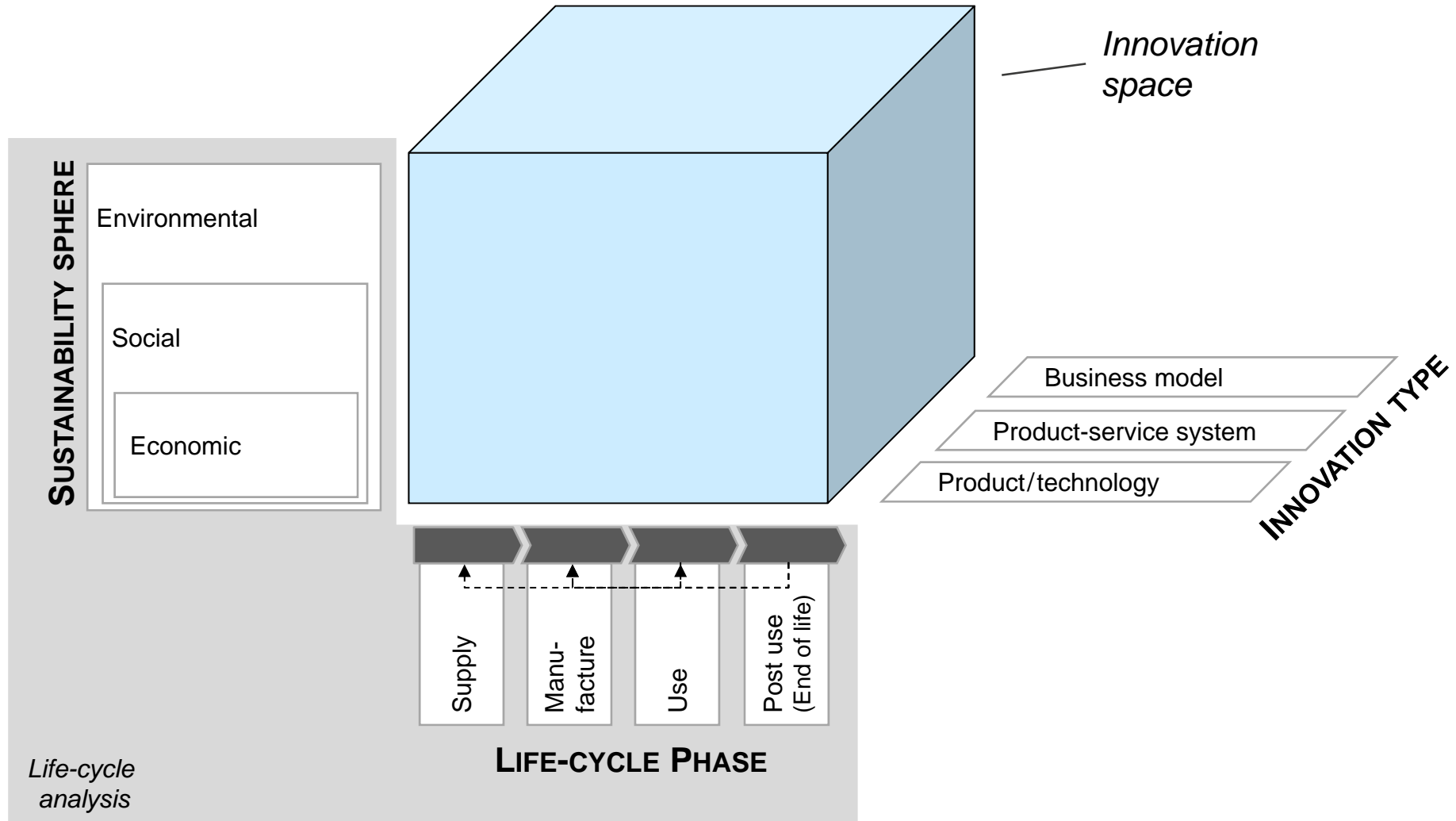
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BACKUP

'SUSTAINABILITY INNOVATION CUBE'



Source: Hansen, Große-Dunker & Reichwald, 2009, p. 695