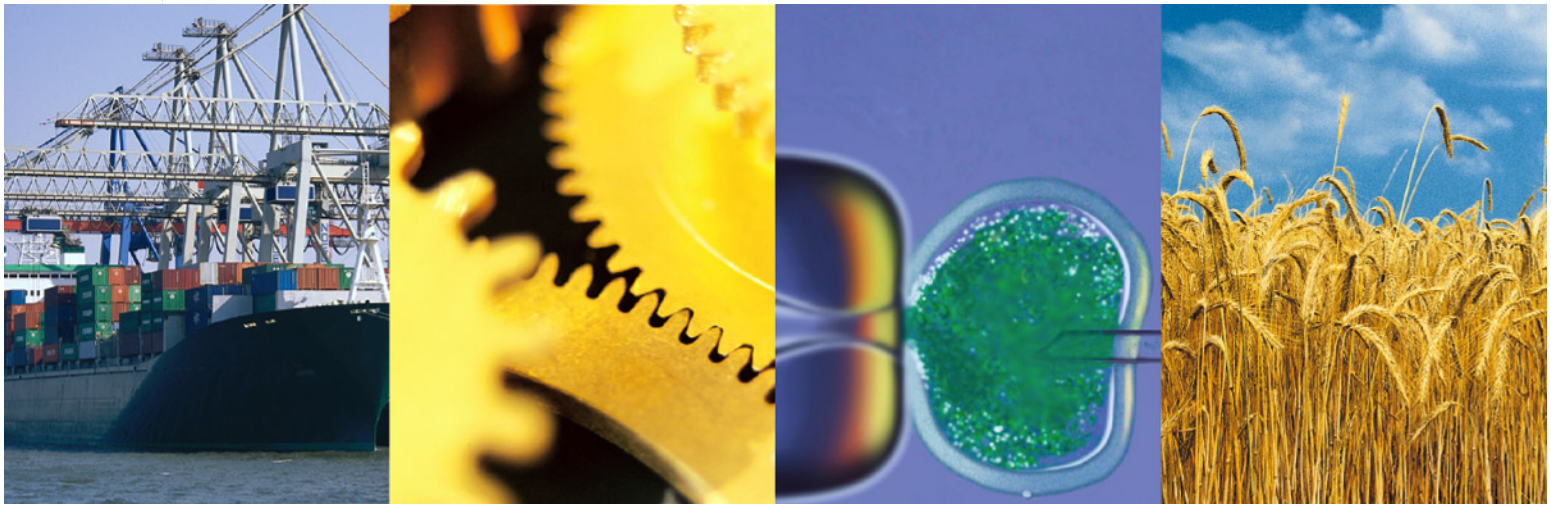
Economic benefits of standards
The ISO Methodology



WSC Academic Week

Geneva, 9 July 2010

Daniele Gerundino
ISO Strategic Adviser to the Secretary-General

Michael Hilb
Lecturer, University of St. Gallen and Fribourg

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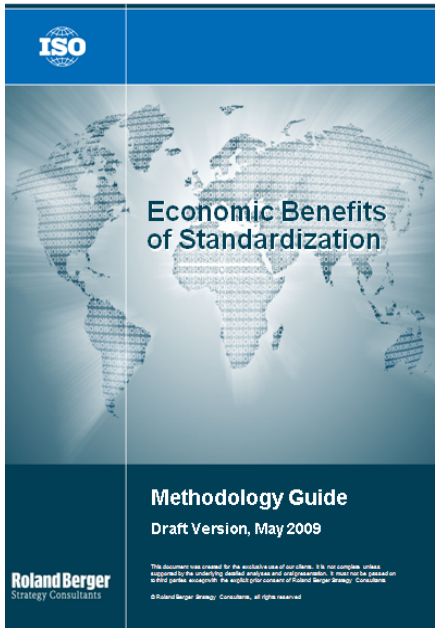
Summary

- Background and objectives of the project
- Core concepts of the ISO Methodology
- Application of the Methodology to the worldwide automotive industry – Outline of results



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Background

- Many studies already completed assessing the value of Standards
- What is the value for an organization in using standards?
- Can a methodology be developed to allow comparison in future studies using the same methodology?

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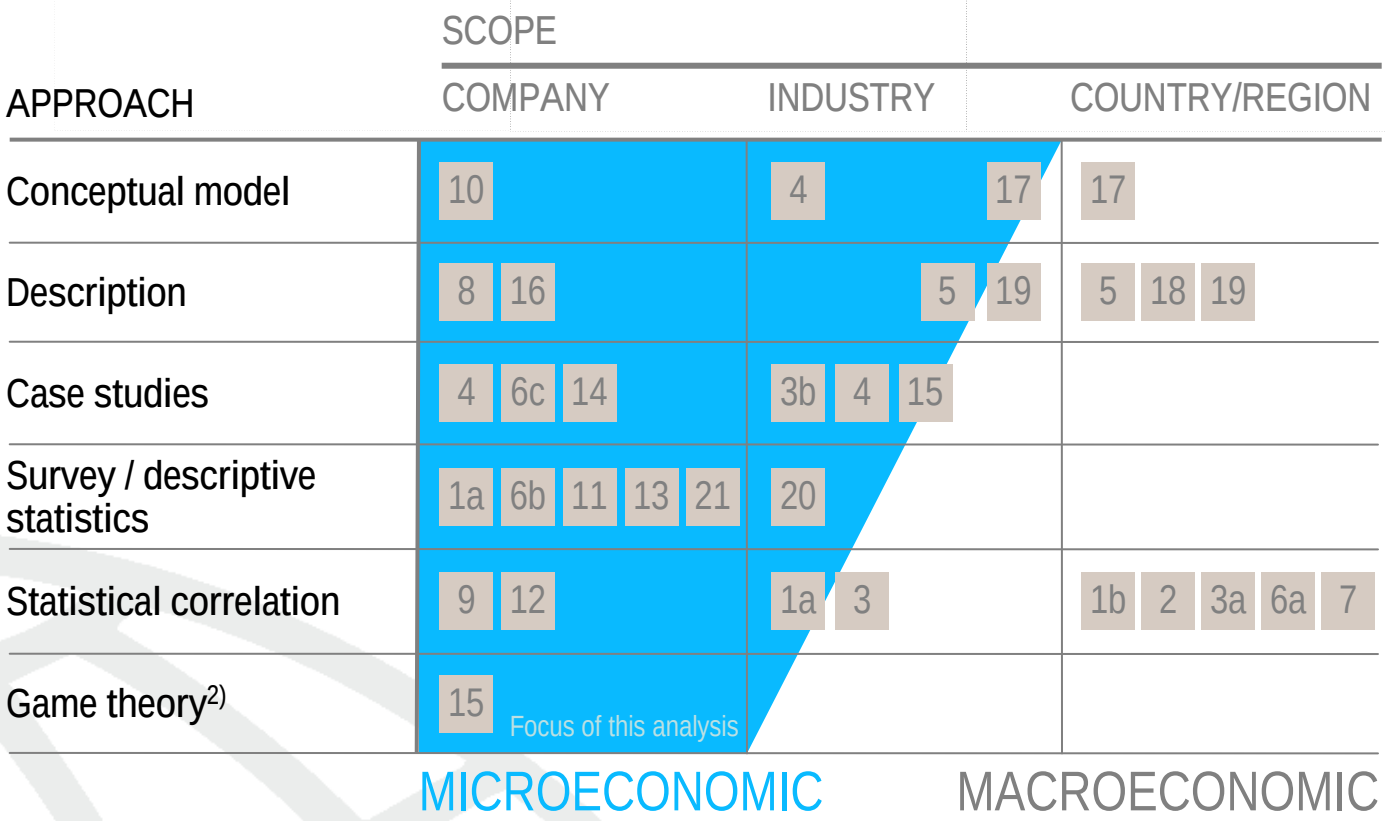
Reviewed studies cover a mix of macroeconomic and microeconomic aspects – Survey and descriptive statistics as preferred approaches

Classification of studies by approach and focus



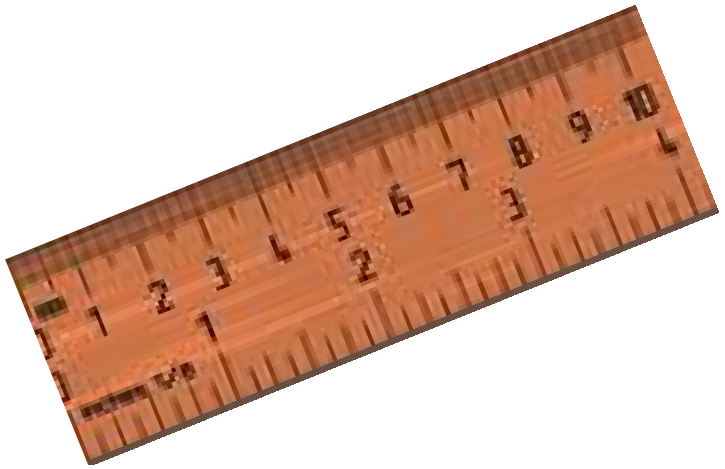
Legend

1 DIN (a: Part 1, b: Part 2)
2 DTI/BSI
3 Standards Australia (a: Part 1, b: Part 2)
4 Shintaku, Univ. of Tokyo
5 NIST
6 Standards Council Canada (a: Part 1, b: Part 2, c: Part 3)
7 Guler
8 Wilson
9 Corbett
10 Jänchen
11 Blind
12 Teerlak
13 Link
14 de Vries
15 Yamada
16 Texin
17 Manchester Business School[1)]
18 WTO[1)]
19 IIED[1)]
20 Blind (Nano)[1)]
21 Blind (ICT)[1)]

1) Not analyzed in detail
2) In this context game theory is regarded as quantitative approach

Objectives of the ISO Methodology

- Measure the impact of standards on an organization
- Provide clear criteria to assess the value of using standards
- Provide guidance when developing further studies to assess the benefits of using standards within an industry sector



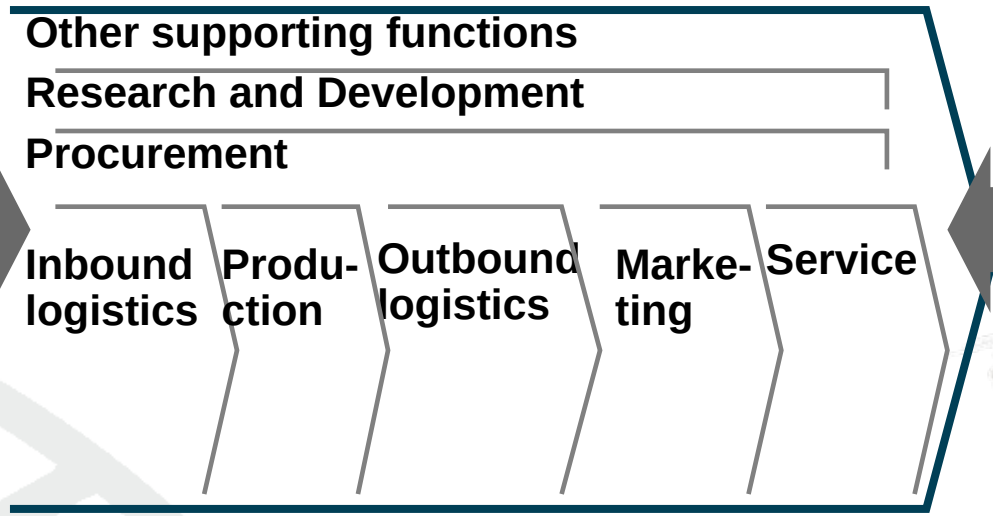
Core Concept – Benefits of standards can be identified along the entire organization value chain and its external interfaces

Access to global procurement markets

> Lower transaction cost
> Consistent quality
> Transparency
> Economies of scale

Facilitates inter-action with public stakeholders, regarding compliance (e.g., safety, health, environment)

Easier cooperation with other companies on common basis



Access to global customers (B2B, B2C and B2B2C)

> Simplified service
> Broader markets
> Broader customer base
> Lower pressure on price
> Lower transaction costs

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The assessment approach helps to answer core questions

Assessment approach

STUDY QUESTIONS

Primary focus

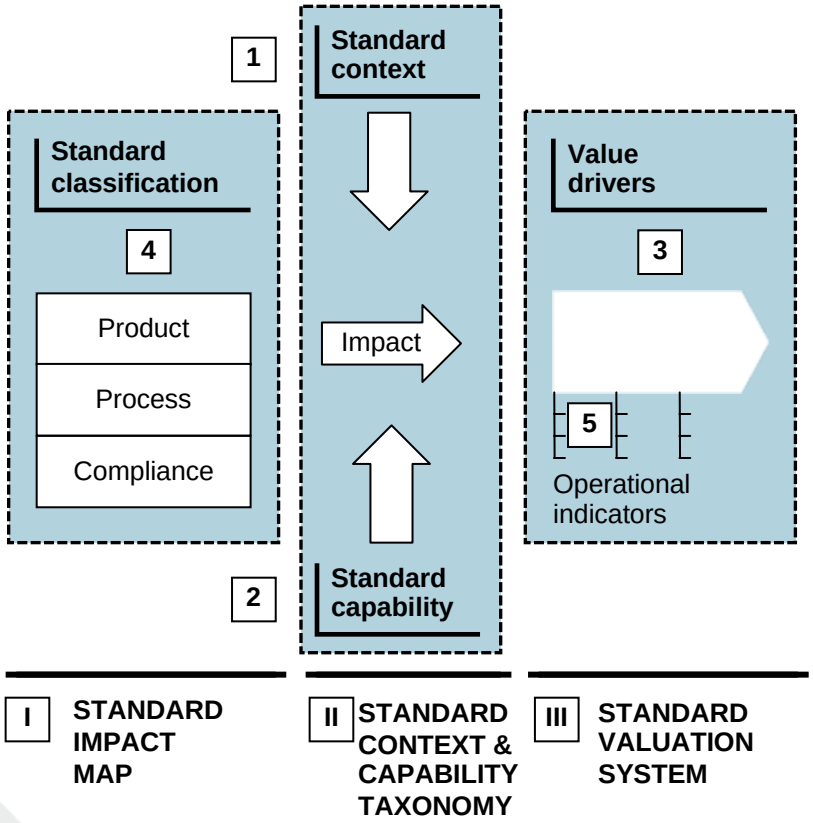
Core question
What is the contribution of standards to corporate value creation?

Secondary focus

Context question
How do industry and company specifics impact corporate value creation due to standards?

Capability question
How can companies maximize the value contribution from standards?

ASSESSMENT APPROACH



1. Understand **value chain**
2. Identify **value drivers** and select the most relevant business functions
3. Identify **impact of standards**
4. **Quantify** core **standard impacts**
5. Assess and **consolidate results**

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The assessment of standard impacts for a company is conducted in four steps

Assessment of standard impacts for a company

1 Understand the value chain

- Clarify industry boundaries
- Analyze the company value chain
- Identify the most relevant business functions

2 Identify the impacts of standards

- Identify impacts deriving from standards for the main business functions and the activities associated with these functions
- Select relevant indicators to identify major impacts of standards

3 Analyze the value drivers and key operational indi-cators

- Identify value drivers to focus the assessment on the most relevant standards impacts
- Derive for each value driver metrics (key performance indicators, KPIs) that can be translated in cost or revenue terms

4 Measure the impacts of standards

- Quantify the most relevant standards impacts
- Calculate EBIT impact for each standard impact
- Consolidate the results
  - Fill in the grey and white spots and aggregate EBIT of impacts on a functional basis
  - Aggregate impacts on the company level

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The Standards Impact Map

Lists a broad variety of impacts of standards on all functions and activities of a company

Impacts of standards on activities

Causes of impacts

Priori-tization [1-3]

Categories of standards

Functions

Activities

Standard Impact Map (Functional Perspective)
Draft 06
April 15, 2009

s	Activities	Impacts	Description	Prioritization [1-high, 3-low]	Standard cat Product	Process
Inbound logistics	All activities	Better internal information transfer	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x
		Better training of personnel	Inbound Logistics staff can be trained better because relevant specifications for both products and services are standardized.	3	x	x
		More efficient logistics	Inbound Logistics can be conducted more efficiently due to the reduced number of types of supplies.	1	x	
	In-house logistics	More efficient receiving of supplies	Standardized documentation, packaging, labels or tags of supplies makes receiving more efficient.	1	x	x
	Warehousing	Reduced warehousing needs	Due to the high availability of standardized products, fewer supplies need to be stored in the warehouse.	1	x	
Produc-tion / Operation	All activities	Better internal information transfer	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x
		Better training of personnel	Production/Operations staff can be trained better because relevant specifications are standardized, for both products and services.	3	x	x
	Processing	More efficient processing	Due to the reduced number of types of non-standardized products, Production/ Operations can become more efficient.	1	x	
		More efficient assembly	Assembly processes are more efficient due to the modular product architecture.	1	x	
		Better quality of equipment and supplies	Higher quality of equipment and supplies based on standards reduces the failure rate and related correction costs.	1	x	x
	Quality assurance	Better quality management	Quality management based on standards can be implemented more effectively.	1		x
	HSE (health, safety and environment)	Reduced disadvantages from regulations	Influence in standard-setting process helps to reduce disadvantages from regulations	3		
		Better health/safety/environmental compliance	HSE management based on standards can be implemented more effectively.	1		x
Outbound logistics	All activities	Better internal information transfer	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x
		Better training of personnel	Outbound logistics staff can be trained better because relevant specifications for both products and services are standardized.	3	x	x
		More efficient logistics	Reducing the number of product types means that Outbound Logistics can be conducted more efficiently.	1	x	
	Packing/shipping	More efficient packing and shipping	Standardized documentation, packaging and labels make packing and shipping goods more efficient.	1	x	x
Marketing and Sales	All activities	Better internal information transfer	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x
		Better training of personnel	Marketing & Sales staff can be trained better because relevant specifications for both products and services are standardized.	3	x	x
		More efficient marketing activities	Marketing & Sales activities can be conducted more efficiently if there are fewer product types.	1	x	
	Market analysis, research	Better competitor information	Since competitor's products have standardized specifications, market research can be conducted more efficiently.	3	x	x
	Marketing activities, client	Better customer information	Communicating product and service specifications and requirements to potential customers is more effective when refering to standards	1	x	x
	Contracting	More efficient contractual agreements	Defined specifications of the company's products and customer requirements makes concluding contractual agreements easier.	1	x	x
	Sales	Higher sales	Sales are higher due to customer confidence in standardized products and services.	1	x	x
		Increased competition	The market share is lower due to more competitors on a market for standardized products and services.	1	x	x
		Reduced time-to-market	For products and services based on standardized components, the time-to-market and market share are higher due to earlier access to technic	2	x	x
		Benefits from participating in standard-setting process	A larger market share can be achieved through the promotion of the own technology to become standard and the acquisition of customers	3	x	x
Service	Customer care and technical support	Better internal information transfer	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x
		Better customer communication	You can communicate information about products and services to customers more effectively by using standardized specifications.	1	x	x
		Better training of personnel	You can train Service staff better if you have standardized specifications of products and services.	3	x	x
		More efficient customer care	Fewer types of non-standardized products make Service activities more efficient.	1	x	
		Reduced consultation needs	Improved quality of standardized products means less consultation required.	1	x	x
		More efficient transfer of internal information	Using standardized documents and specifications makes passing on internal information about products and services more efficient.	2	x	x

Main value drivers are identified and described by operational indicators affecting the relevant business functions

Example of the Industrial Machinery sector

SPECIALIZED MACHINES

Value drivers	Indicators (examples)		
R&D effectiveness	R&D costs	Number of patents	Average product age
Sales effectiveness	Customer contact	Marketing & Sales costs	Customer acquisition rate
Quality of production processes	Production costs	Defect rate	Process time
Control over high-margin after-sales market	Service revenues	Spare parts sold	Maintenance costs
Focused value chain coverage	Sales per employee	Depreciation	Asset efficiency
Flexibility	Adaptation potential of machines		
Global footprint	Geographical coverage of sales offices		
Customer service			

STANDARD MACHINES

Value drivers	Indicators (examples)		
Efficiency of production	Production costs	Product complexity (lean designs)	
Quality of production processes	Production costs	Defect rate	Process time
Quality of products	Cost-benefit ratio	Number of recalls	
Sales effectiveness	Customer contact	Marketing & Sales costs	Customer acquisition rate
Control over high-margin after-sales market	Service revenues	Spare parts sold	Maintenance costs
Focused value chain coverage	Sales per employee	Depreciation	Asset efficiency
Customer service			

COMPONENT MANUFACTURERS

Value drivers	Indicators (examples)		
R&D effectiveness	R&D costs	Number of patents	Average product age
Focused value chain coverage	Sales per employee	Depreciation	Asset efficiency
Quality of production processes	Production costs	Defect rate	Process time
Quality of products	Cost-benefit ratio	Number of recalls	
Efficiency of production	Production costs	Product complexity (lean designs)	

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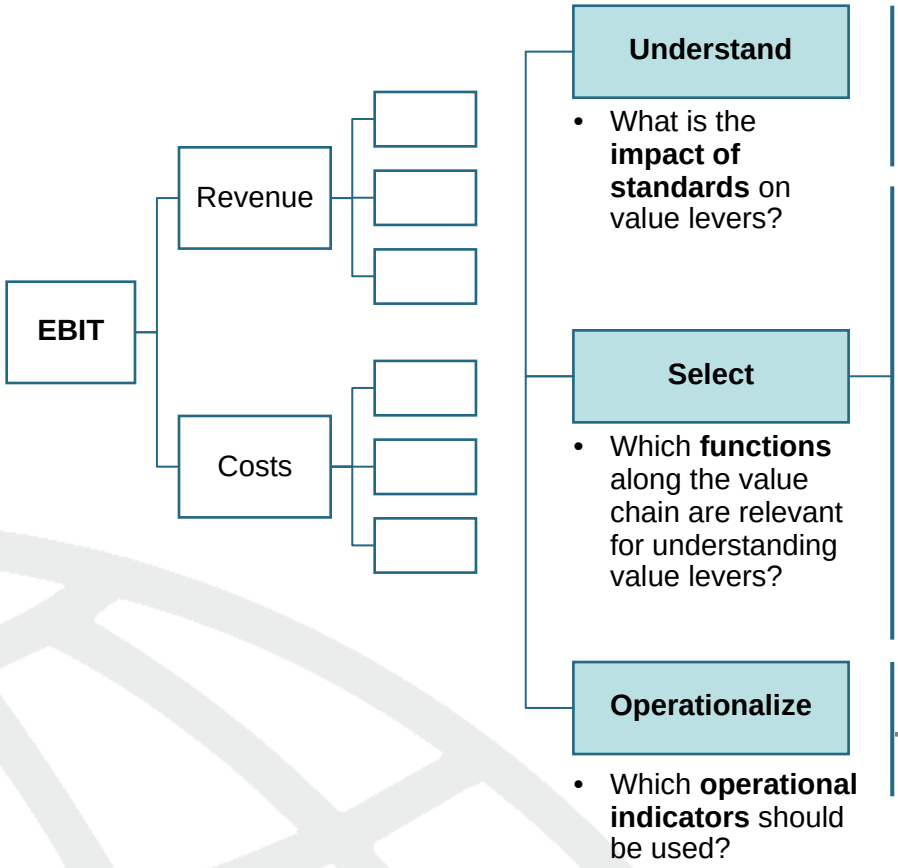
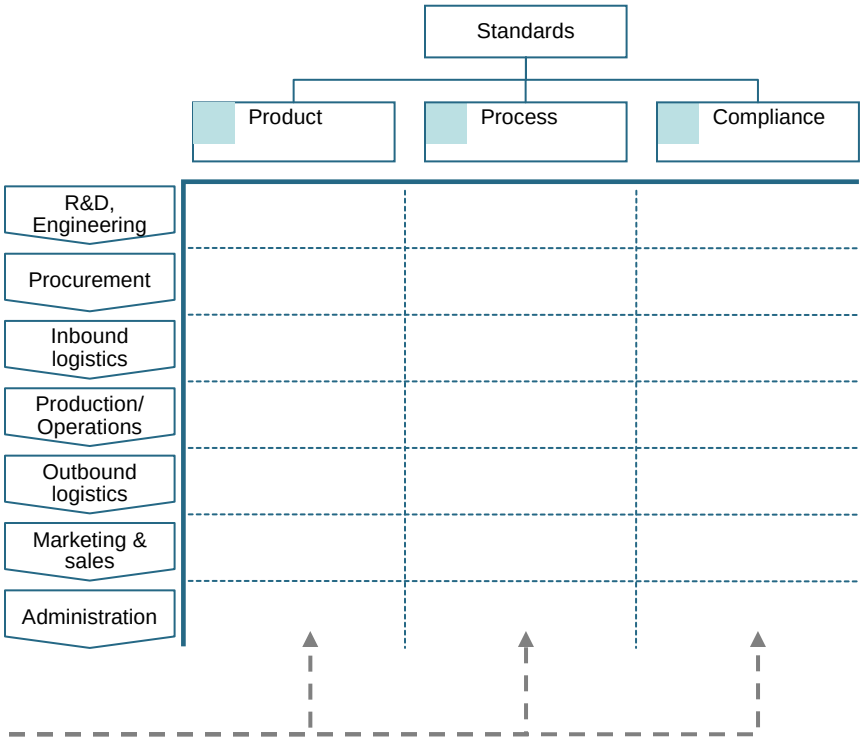
The impacts on operational indicators are converted in EBIT impacts

FUNCTIONS OF THE VALUE DRIVER TREE



STANDARD IMPACT MAP



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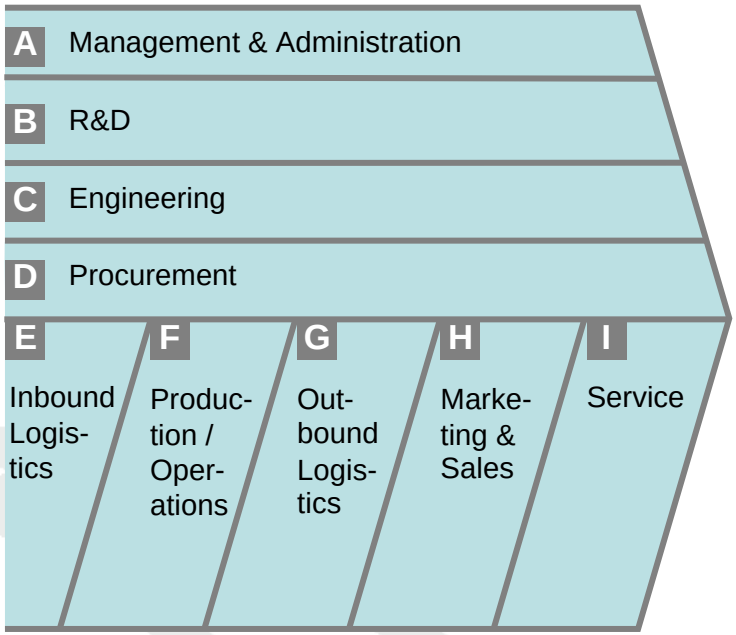
By combining direct assessments and extrapolation for individual impacts, the total EBIT impact for a company can be estimated

Example of Aggregation – Industrial Machinery company (USD 9.7bn. revenues)

FUNCTION OVERVIEW



AGGREGATION APPROACH

	EBIT IMPACT [mUSD]	DIRECT ASSESS-MENT	EXTRAPOLATION	CORREC-TED EXTRA-POLATION	CALI-BRATED ESTIMATE
A	0.7		x		
B	8.4[1)]	x			
C	-				
D	20.2				x
E	0.7				x
F	67.4		x	x	
G	0.7				x
H	70.7		x		
I	0.7				x
	Σ = 169.2				

1) The R&D and Engineering function are idem in the example

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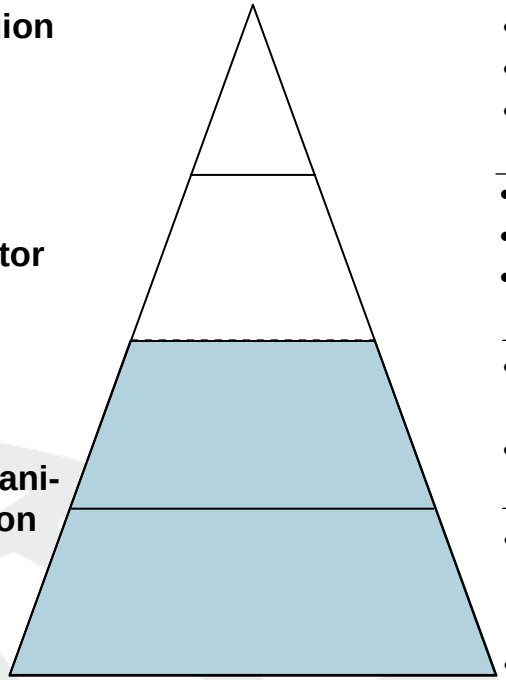
Focus of the methodology: analysis of the impact od standards on organizations' performances and sector benchmarking

Level of analysis

LEVEL OF ANALYSIS	EVALUATION OF BENEFITS	QUANTIFICATION
Region	• Productivity • Export and trade • Employment	• Aggregation of value chain impacts is far fetched • Macro-economic analysis better suited
Sector	• Sector productivity • Sector growth/profit • Export contribution	• Aggregation of value chain impacts is challenging • Network effects and sector interdependencies need to be carefully analyzed
Organi-zation	• Relative performance of companies (or sub-sectors) • Identification of issues and priorities	• Benchmarking • Data and views from different types of players (SMEs vs..large, developed vs. emerging, etc.)
	• Sales growth (broader mar-kets, increased consumer confidence) • Cost reduction (efficiency gains, economies of scale)	• Focus of analysis • Assessment of value chain impacts by function and activity



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To conduct the assessment for an industry sector three steps are to be followed

Assessment of standards impact at sectoral level

1

Define scope

- Define sector boundaries according to the industry value chain and in relation to supporting sectors
- Select organizations by ensuring a heterogeneous sample (company type, size and location of companies)

2

Conduct assessment

- Conduct the basic assessments on a company level as described in the four steps of organizational assessment
- Identify and categorize industry topics

3

Understand benchmarks

- Consolidate quantitative data on the industry level
- Build hypothesis to answer the core, context and capability question

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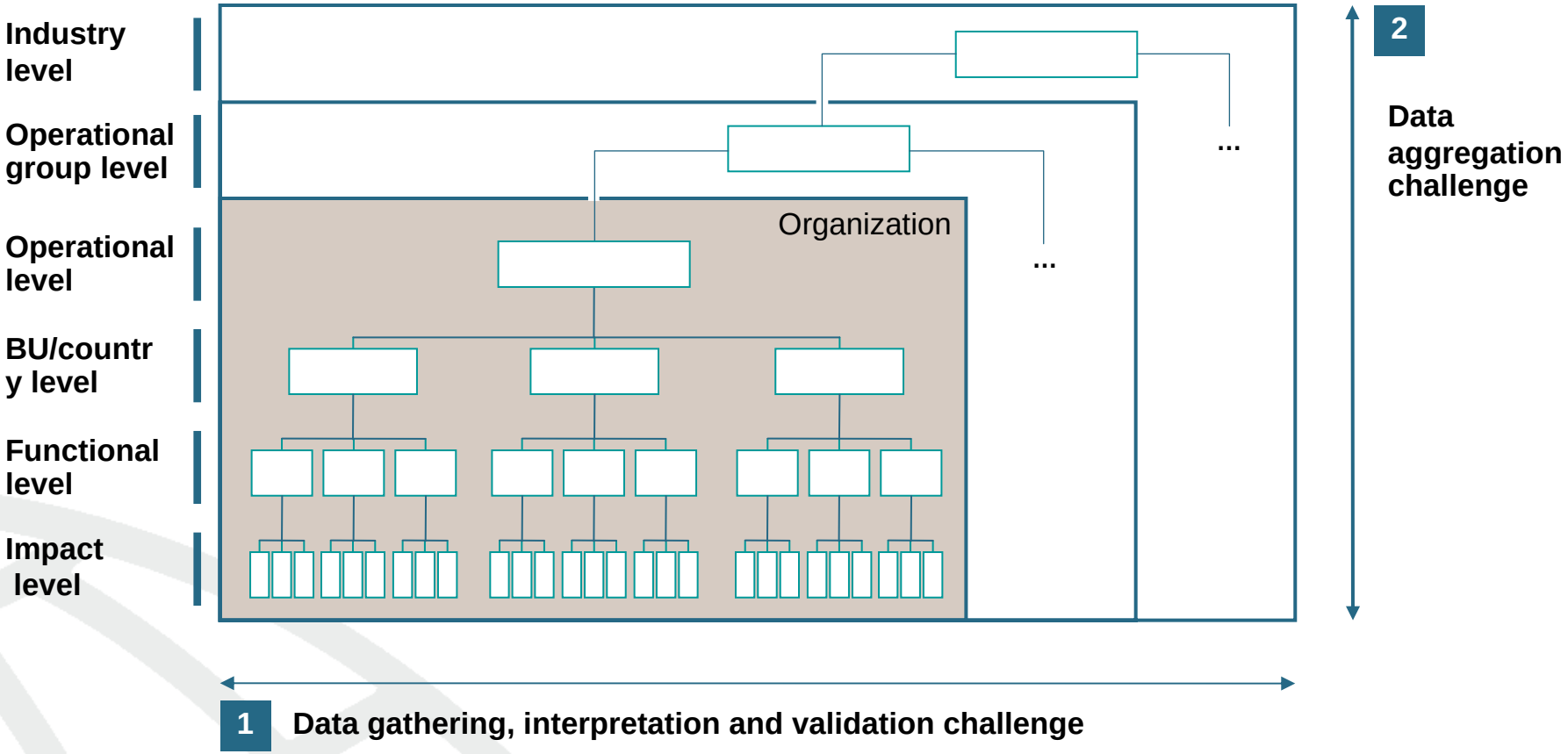
Two challenges need to be dealt with in assessing and consolidating the data

Assessment approach



Core of approach

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The methodology and its application are described in detail in the Methodology Guide

Methodology guide

GUIDE

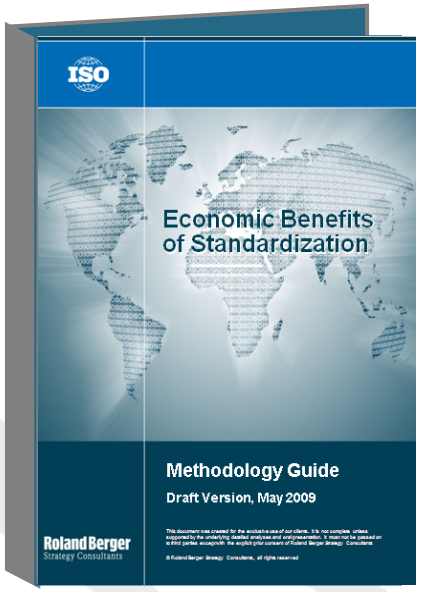

TABLE OF CONTENTS

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Application of the methodology – Outline of results for the Worldwide automotive sector

Objectives

- Test the application of the methodology
- Fine tune the approach and tools used
- Derive updated input on trends and needs of an industry of primary interest for international standardization

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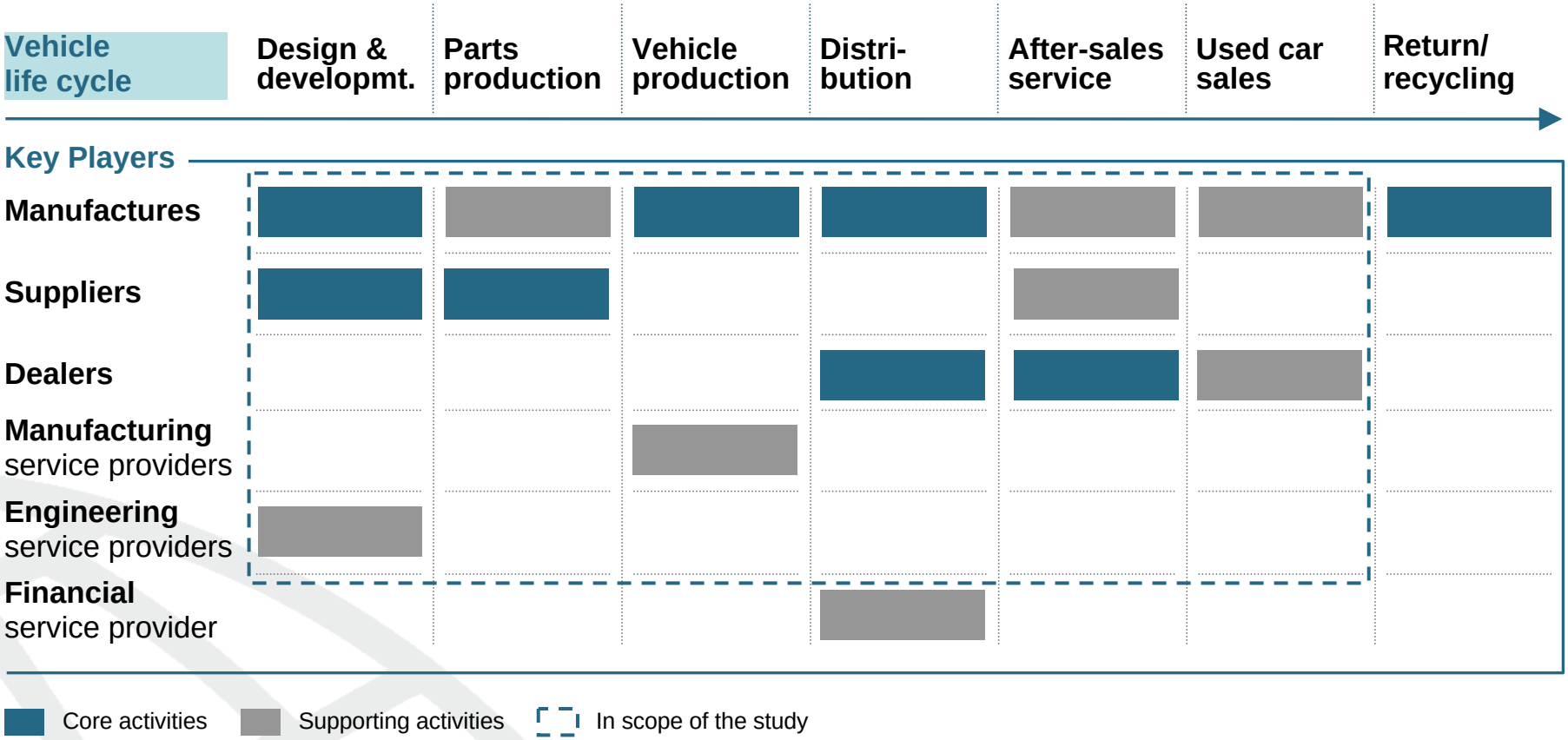
Main players in the value chain are the manufacturers and the parts suppliers – Financial services and recycling are out of scope

Automotive value chain and scope of study



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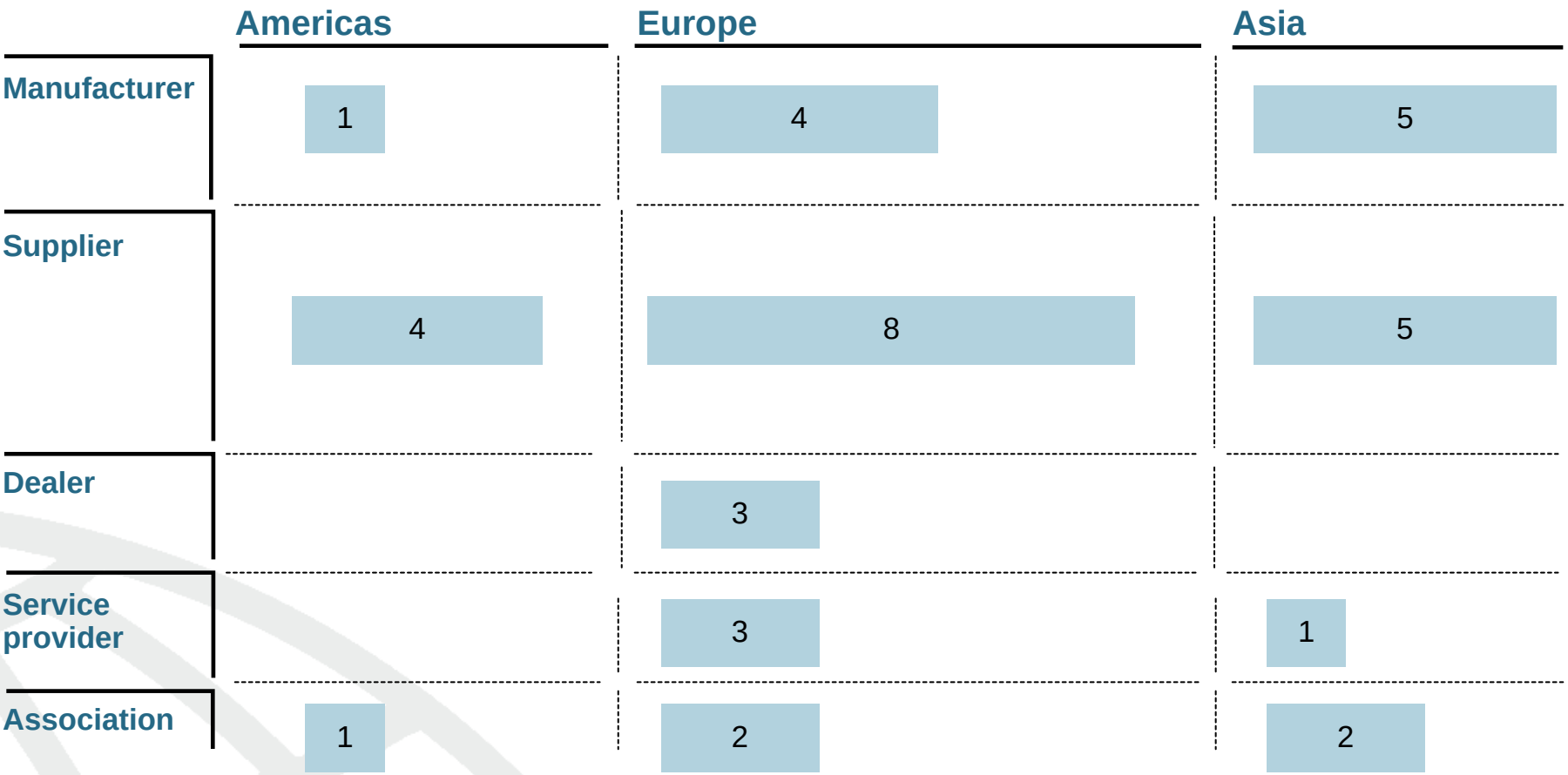
A broad coverage of companies has been included in the sample of the field study

Field study sample – Companies and organizations



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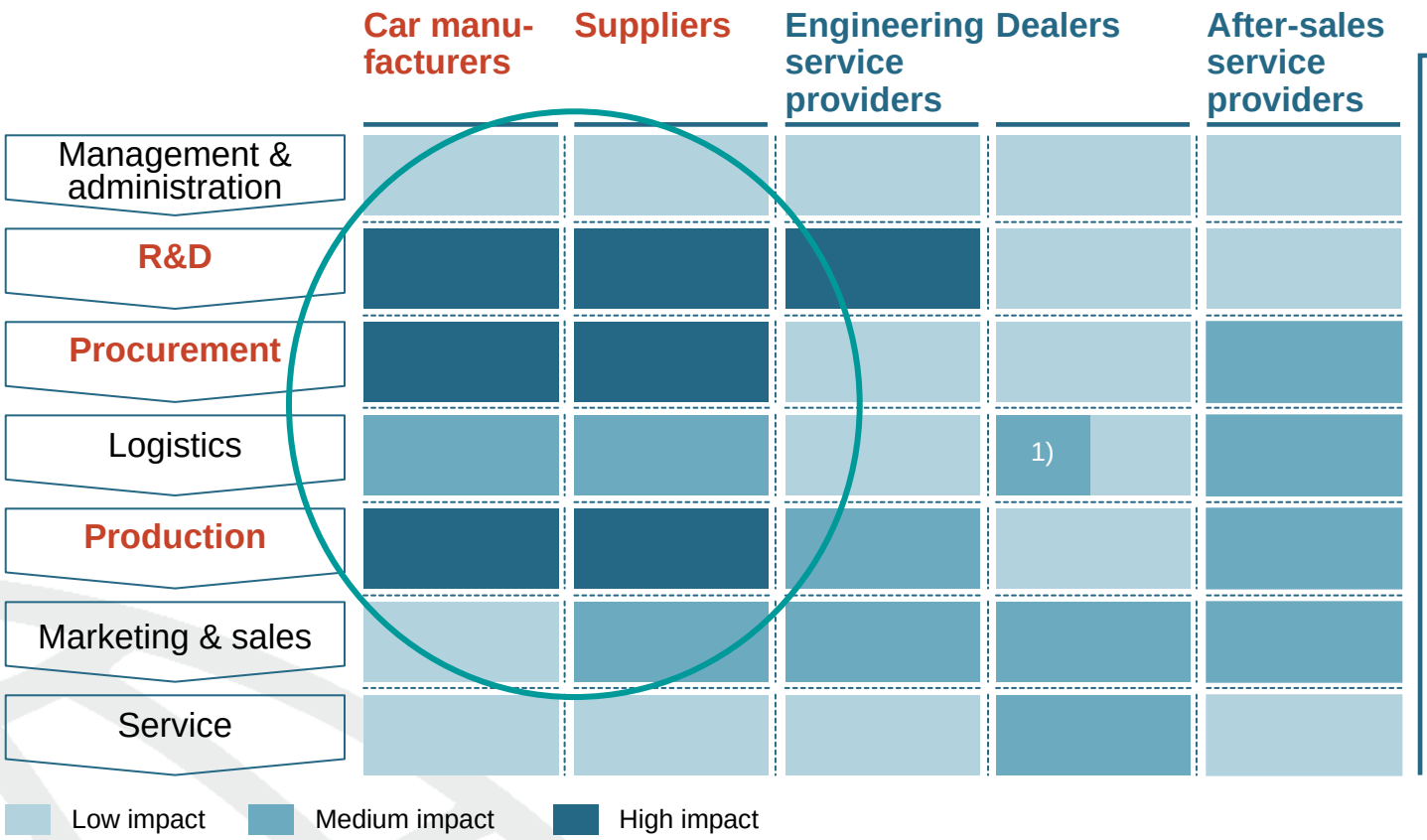
The intensity of standard impacts varies by company type and functions

Intensity of impact from standards by company type and function



Comments

- Main impact for most companies in **R&D** with standards as basis for product development
- **Procurement** impact is most relevant due to economies of scale and variety reduction
- Process standards in **Production** have high impact on quality

1) Spare-part distributors

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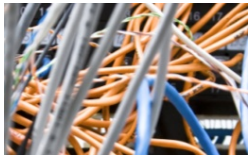
Types of standards relevant to the Automotive industry

	CATEGORY	EXAMPLES	SCOPE OF STANDARDIZATION
	**1 Vehicle components and engineering**	• Breaking systems • Impact test procedures	• Mainly specified by car manufacturers • Partly based on international standards
	**2 Basic mechanical and electrical parts**	• Fasteners • Wires • Fuses	• Consensus-based standards • Mainly international • Some national and regional standards in US
	**3 Materials**	• Metal • Plastics • Glas	• Consensus-based standards • Mainly international
	**4 Management systems**	• Quality management • Environmental management	• Mainly specified by car manufacturers • International standards also typically required (e.g. ISO TS 16949) • Other process standards such as from VDA are almost replaced by ISO standards

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Outline of results – Various cases of the impact of standards have been assessed along company value chains

Model cases of the impact of standards

Impact: Reduced product development costs
Company: Supplier
Country: Germany
EBIT impact: USD 13 m

Impact: Improved quality management
Company: Supplier
Country: Canada
EBIT impact: USD 22 m

Impact: Improved internal information transfer
Company: Car manufacturer
Country: India
EBIT impact: USD 43 m

Impact: Efficient reception of goods
Company: Dealer
Country: Czech Republic
EBIT impact: USD 140 k

Impact: Improved customer confidence
Company: Service provider
Country: Germany
EBIT impact[1)]: USD 592 k

1) Assuming 5% BIT margin

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Examples of standards benefits for companies in the automotive sector – R&D and Engineering

- **Component supplier – research on metal testing**. Standardized testing procedures provide significant gains in research efficiency, and research costs were estimated to be 10% higher without existing testing standards. This corresponds to total savings for the company of USD 5 million
- **Parts and systems supplier – data systems design** Custom-development of a Class 2 serial data system for a car manufacturer (starting from scratch). Total cost of the project: about USD 15 million. This made it possible to compare it to other projects for which relevant ISO and SAE standards were available. Cost savings were estimated at 15% of total project costs.

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Examples of standards benefits for companies in the automotive sector – Procurement

- **Car manufacturer – Engine mass specs**
  The DIN 70020-7 standard defines i.a. which parts of the engine have to be included in the total mass specification. This enhanced the information transfer between car manufacturers and suppliers. One car manufacturer has estimated that the annual savings due to just this specific standard amount to EUR 45,000
- **Parts supplier – Standardized materials and components**
  An engine component manufacturer found that significant cost savings result from the fact that standardized components are more available on the market. Without the reduced costs for replacement components, it was estimated that total costs would be around 3% higher (i.e. USD 2.1 million) on an annual basis.

Sample estimate of contributing impact of standards on value creation in the worldwide automotive industry

Aggregation of contributing effects [% of turnover, annualized impact, example][1)]

	RANGE OF AVERAGE EFFECT			COMBINED EFFECT	
	R&D	Procurement	Production		
					
OEMs	0.02% - 0.03%	1.81% - 2.58%	0.56% - 0.80%	1.19% - 1.70%	1.29% – 1.84%
SUPPLIERS	0.67% - 0.96%	1.37% - 1.96%	0.64% - 0.91%	1.43% - 2.05%	

CAVEAT:

- The aggregation example is based on a **small number** of company assessments
- These preliminary results **need to be consolidated** through addtional company assessments

1) Based on a five year perspective, only considering pure automotive players

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Projected standards impact on the automotive industry worldwide

Assessment status

STUDY CONDUCTED TO DATE ☑

Preliminary findings

Sample size
(number of fully assessed companies)

	OEMs	Suppliers
R&D	2	6
Procurement	1	5
Production	1	3

Contributing impact:
1.29-1.84%/sales

Limited data reliability

USD 28-55 bn

Further company assessment needed to increase data reliability

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Implications for standardization in the automotive industry have been identified for four levels of characteristics and trends

Industry characteristics and trends with implications on standardization

Products and value chain

- Standardization needed to enable **efficient division of labor**
- Emerging issues regarding standardization in fields of **electronics and software**

Geography

- New standards to account for **emerging vehicle concepts** and low-cost components
- Need for quality standards for **international comparability**

Consumer orientation

- Exploitation of **economies of scale** by standardizing invisible components
- Further shift of **differentiation focus from technology** to design and marketing

Regulatory requirements

- New standards required for **electric vehicles and infrastructure**
- Open **safety issues** with high-voltage vehicles

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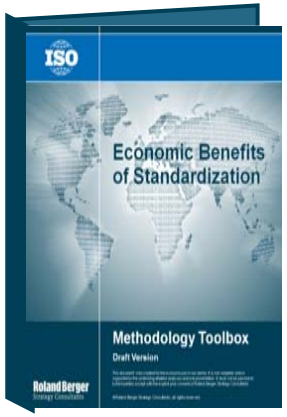
Deliverables

METHODOLOGY TOOLBOX



METHODOLOGY GUIDE

IMPLEMENTATION GUIDE

APPLICATION TO THE GLOBAL AUTOMOTIVE SECTOR

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Dissemination and Implementation

- Deliverables finalized and available to ISO members
- Set-up of ISO/CS competence center
- Organization of workshops
- Cooperation with academic institutions (development of case studies, internships, etc.)
- Pilot projects to be run by ISO members in various regions

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Thank you for your attention!

http://www.iso.org

Repository of studies on the economic and social benefits of standards:
http://www.iso.org/benefits

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