

Greening the Water Economy by implementing a sustainable management and integrating renewable energy and sustainable water supply

Marlen Arnold

marlen.arnold@uni-oldenburg.de
University of Oldenburg
Nature Inspires

Thomas Pieper

thomas.pieper@uni-oldenburg.de
University of Oldenburg

Research question

How do water companies implement sustainability and CSR requirements in their management?



Agenda

- Central challenges
- Water industry
- Sustainability management
- Empirical research – the study
- Results
- Conclusions



Central Challenges

- Decreasing population numbers and falling specific need of water of the households and businesses (Lux/Hummel 2007; Hummel 2008; Koziol et al. 2006; UBA 2010)
- Price margin between increasing water sewage prices and decreasing consumption (fixed costs lock-in effect, Koziol et al. 2006)
- New requirements of resource regulation, especially matters of cost coverage and economic efficiency (EU Water Framework Directive; Kluge 2005)
- Shortage of resources and the rise of prices for energy and raw materials (BMU 2008, 2009; Kemfert/Müller 2007)
- Climate change with its global and regional consequences to the water economy (Howard et al. 2010; Charlton/Arnell 2011; Krebs et al. 2011; LUBW et al. 2010)
- Cost of adaptation to the climate change (Gebhardt et al. 2011)
- A changed energy policy framework because of objectives and legal developments at the European and national levels

Water industry

- Water supply and waste water disposal: high energy demand → close coupling of water industry and power industry
 - Power industry: 1998 market liberalization → incremental expansion of renewables
 - Water-related infrastructure is highly path-dependent
 - Mass production and increase of use
- Resource management should focus more on local, decentralized nets
- De-coupling of centralized grids

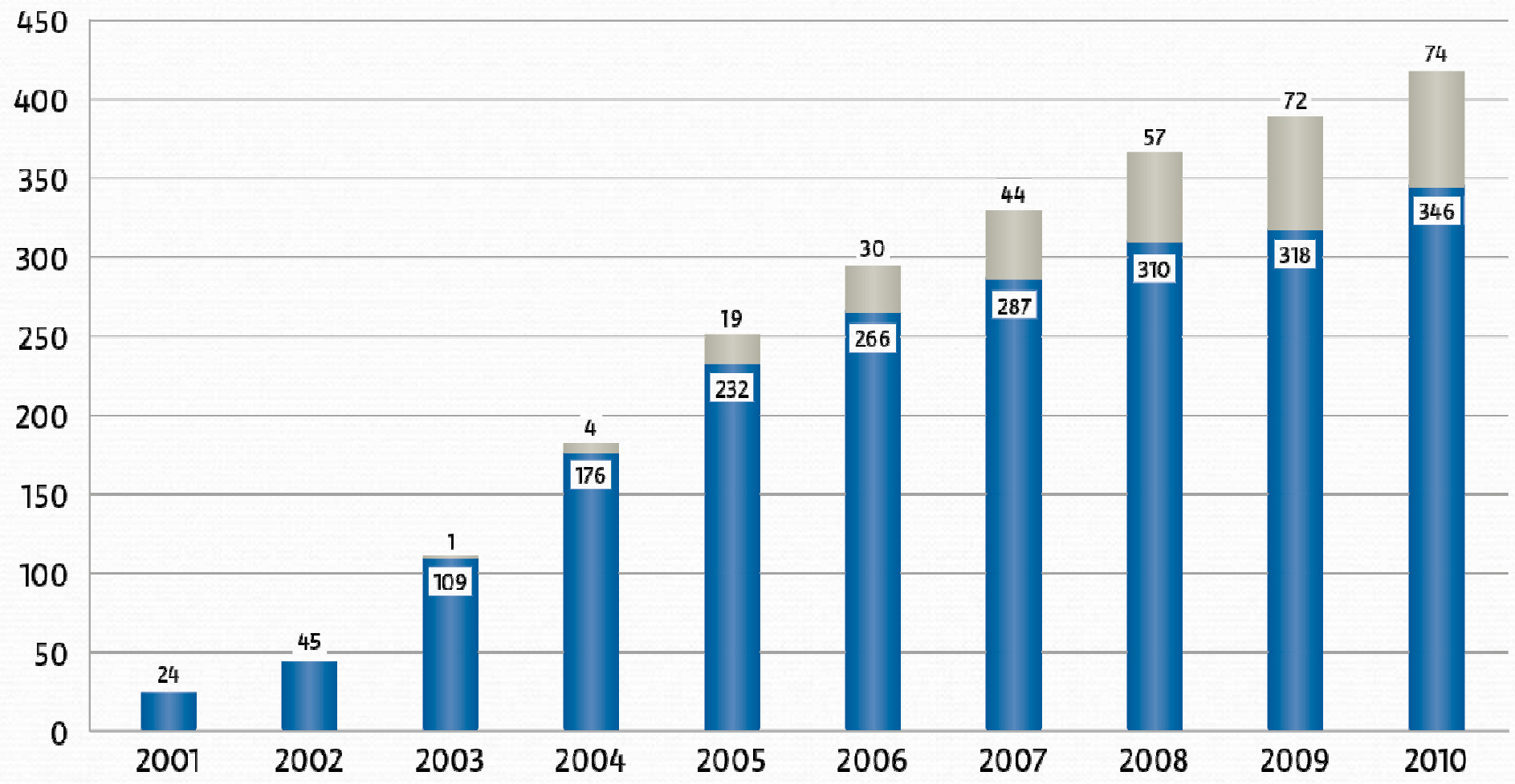


Water industry

- There have been private-law and municipal companies in the water industry for decades (BDEW 2011)
- According to BDEW (2011) there are 6.211 WSC operating in Germany
- Municipal and private-law companies have different values referring to the number of companies and the volume of water
- Referring to the number of companies: 56 % municipal institutions and 44 % private-law ones
- Referring to the volume of water: private-law companies have 64 % interest and the municipal ones a 36 % share

Water industry

Water supply companies and TSM development



Quelle: DVGW, DWA

■ waste water ■ water

Sustainability and CSR

1994 Oslo: sustainable production and consumption
→ quality of live and life cycle

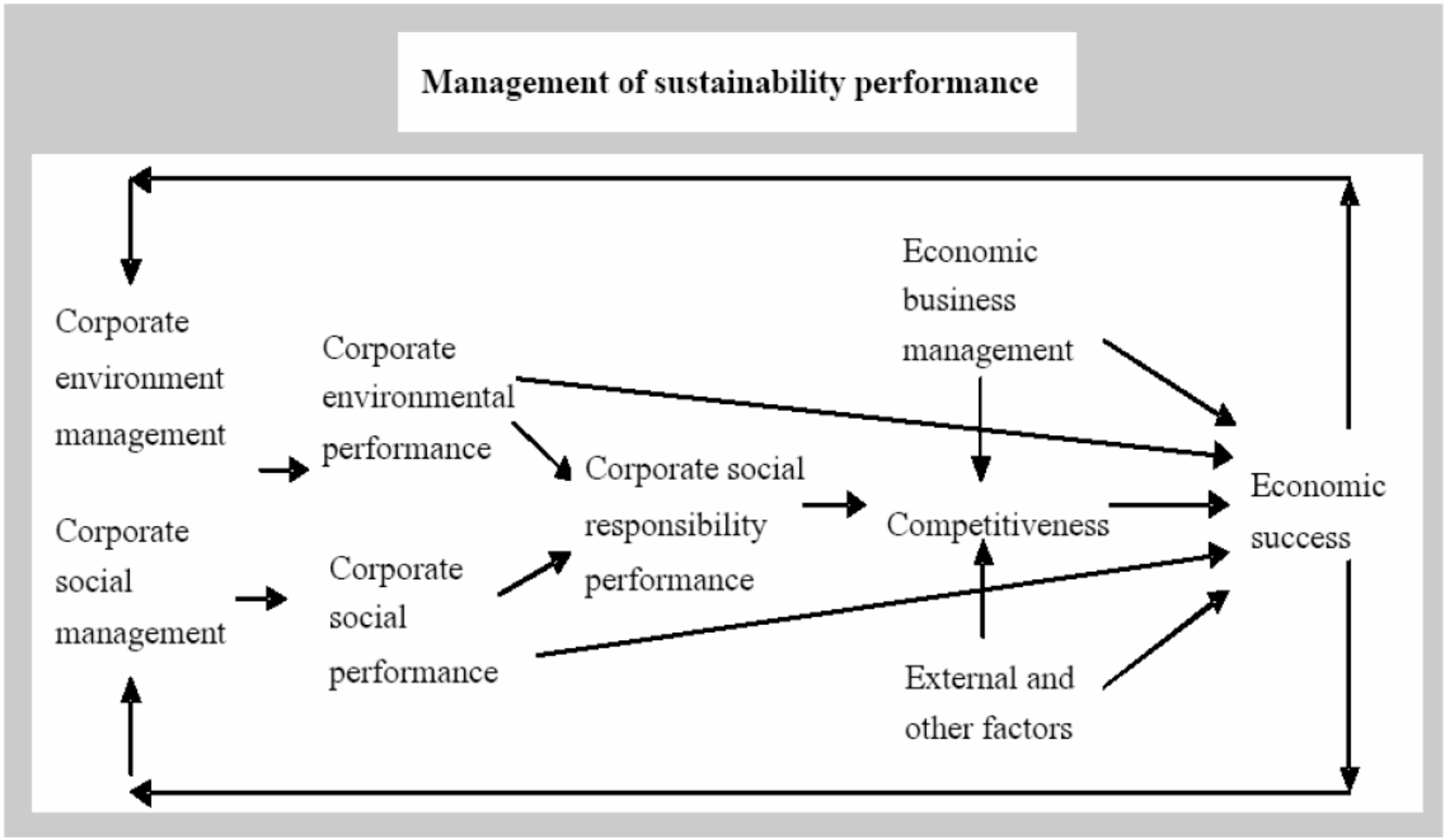
“the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations”.

Social responsibility: **7** core subjects

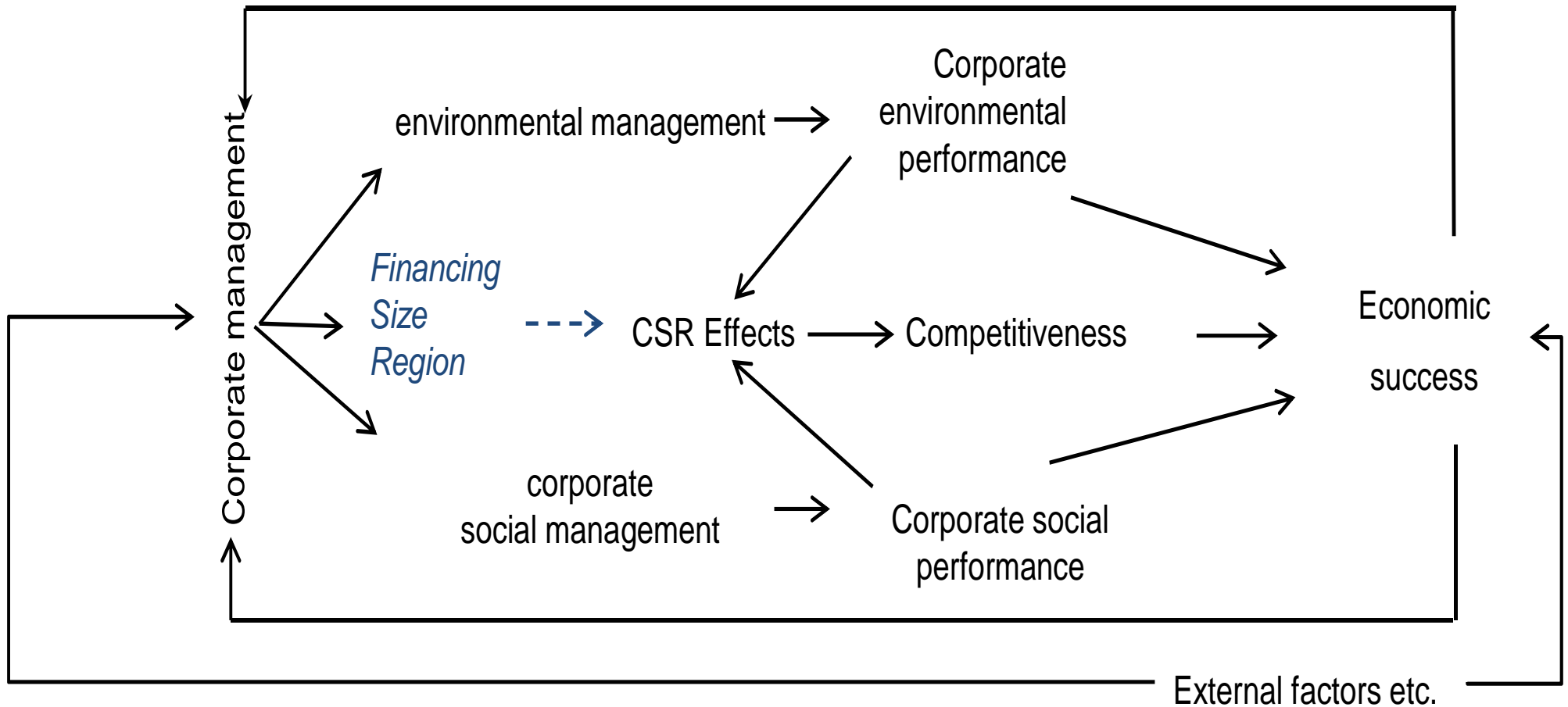


Sustainability management

Management of sustainability performance



Sustainability management



Erfolgskriterien des Nachhaltigkeitsmanagements

Sustainability challenges	Relevant queries	Criteria of success and Management approaches/ instruments
Ecological	How can a company reduce its absolute environmental impact caused by value creation processes?	Increase of Eco-efficiency (eco accounting, life cycle assessment, material flow management, material and energy flows, etc.) → eco-efficiency measures the degree of absolute environmental compatibility (ISO 14001, EMAS, energy management – ISO 50001)
Social	How can socially undesirable effects of the business processes be minimized?	Increase of Socio-efficiency Stakeholder dialogues, proactive social management, SA 8000, ISO 26000, Social standards at suppliers, supply chain management, CSR, etc.
Economical	How can environmental protection and social engagement be realized in a reasonable way by maintaining or increasing profitability and company value?	Increase of eco- and socio-efficiency <u>eco-efficiency</u> : ratio of value to ecological environmental damage <u>socio-efficiency</u> : ration of value creation and social harm caused by business processes (ISO 9001, ISO 17025, Energy management)
Integration	Meeting environmental, social and economic demands simultaneously: How can environmental and social aspects be integrated into economical decision processes permanently?	The integration of ecological, social, economic perspectives: Eco-controlling, sustainability marketing, sustainability reporting, Sustainability Balanced Scorecard (SBSC)

Empirical Design

- Instruments of sustainability management
- CSR criteria: seven core subjects of ISO 26000 → Organizational governance, Human rights, Labour practices, The environment, Fair operating practices, Consumer issues and Community involvement and development
- approx. 6600 WSC in Germany → 65 representative German WSC
- January 2011 until September 2011
- Literature study, web analysis: over 150 pdf and 350 webpages
- Key word analysis, qualitative/quantitative content analysis and contingency analysis



Empirical Design

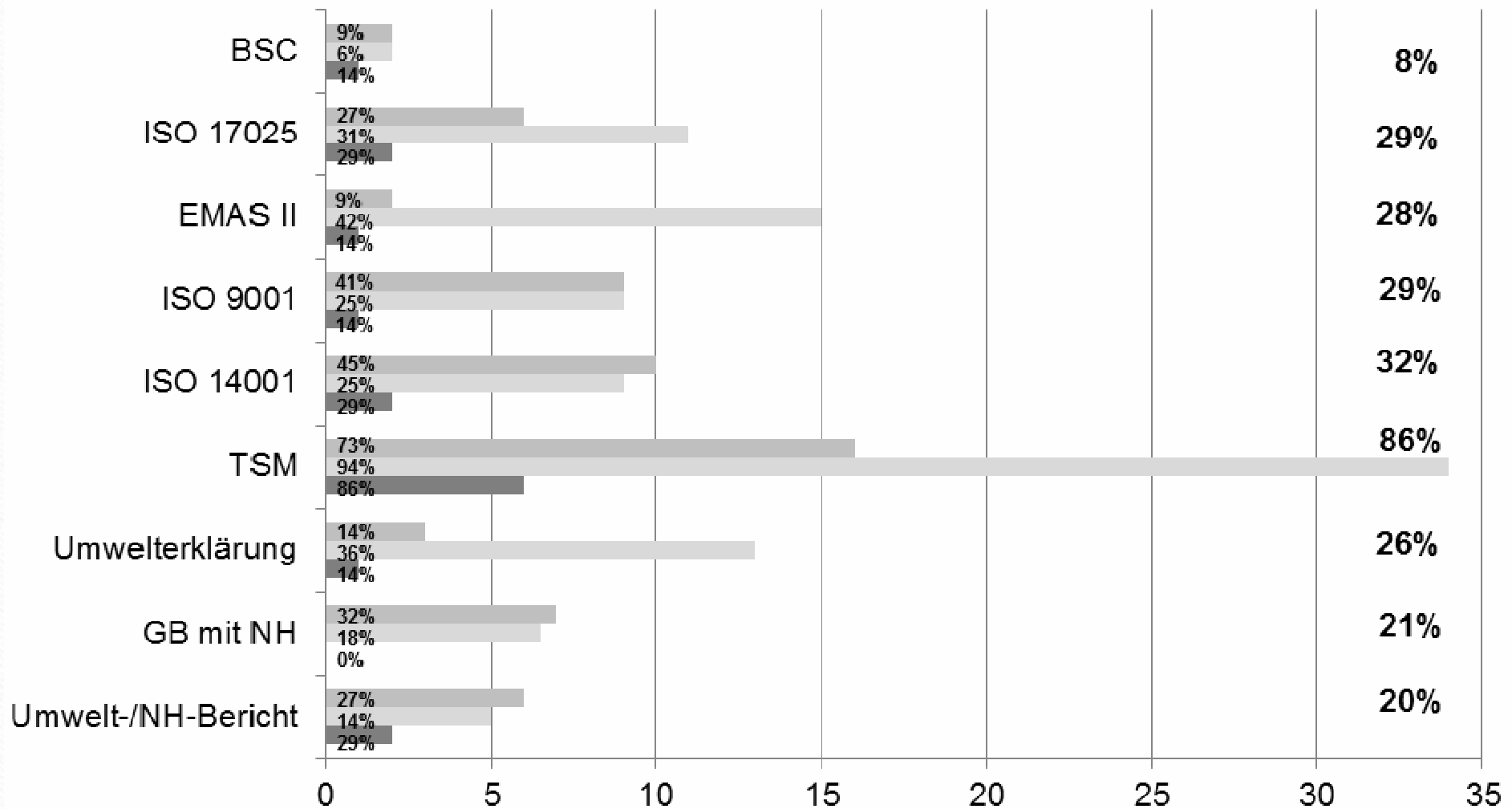
- Secondary data analysis
- segmentation of WSC regarding size (turnover, supply area & organisational members)
- classification in private law and municipal organisational forms
- Regional, national and international operation (municipal utilities/ public services vs. affiliated groups)

- The sample: all 16 federal states (19 south, 21 west, 15 north, 10 east)
- 55% municipal businesses, 34% private sector and 11% are mixed-financed companies
- 1 small business, 9 medium-sized enterprises and 47 large companies. 8 companies more or less SMEs



Results

Level of implementation of management approaches

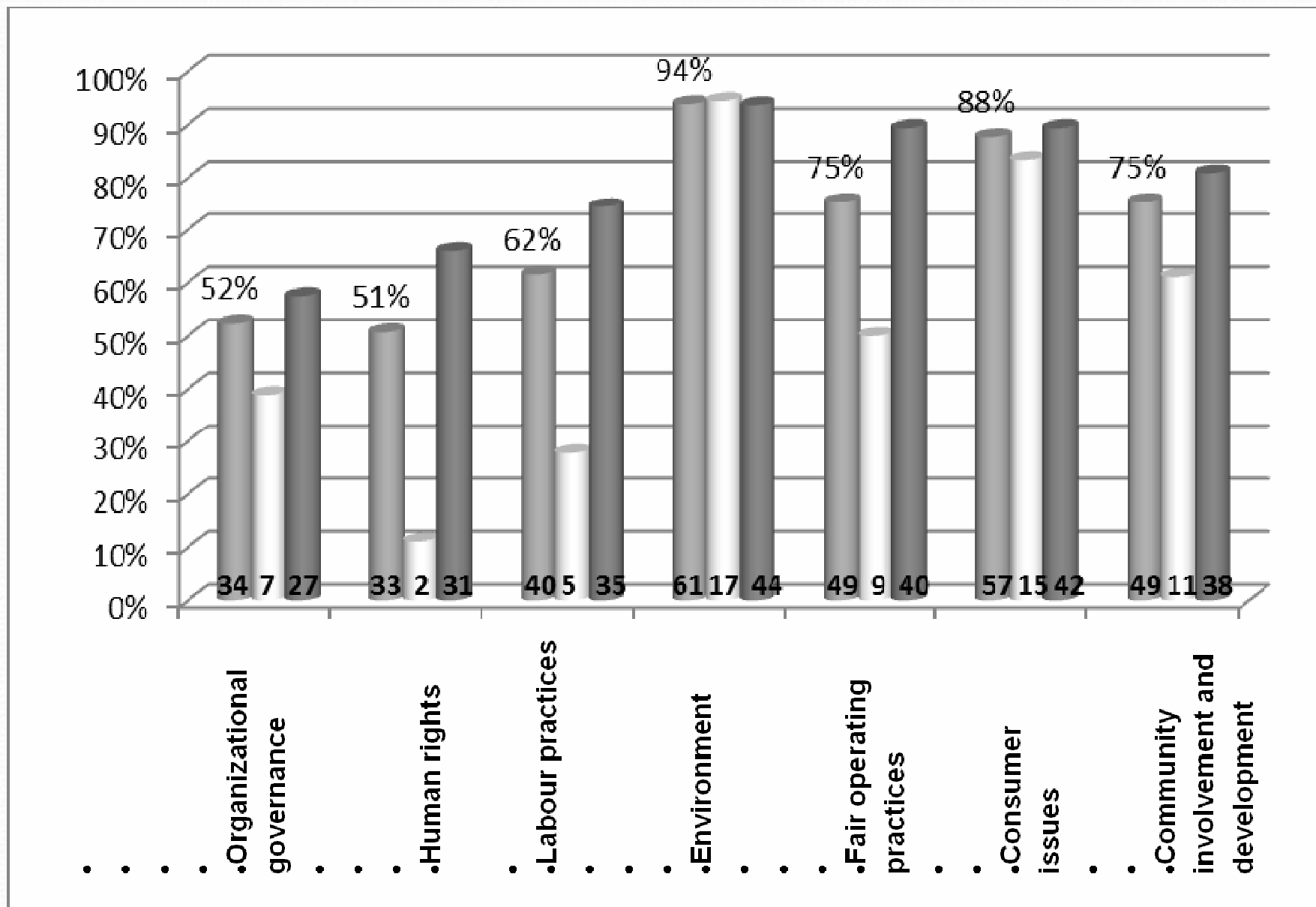


N=65; (upper line = private companies,
middle line = municipal companies,
lower line = mixed financed companies)



Results

Identification of CSR elements



Results CSR

- "Our CR strategy addresses the challenges of our core business. It covers ten areas for action, bringing themes and issues together, where we are most required at CR aspects. These include climate change, energy efficiency, security of supply, but also supply and demographics. For each of these fields we have set ourselves a binding and measurable goal. Learn more about this on these pages and in our CR Report 2010."
- "... Together with six local volunteers, they purified an important part of the sewer system. With shovels, rakes, pitchforks and of course with great force the canal was cleared, at least in part."



Discussion

- economic performance (cost) in comparison to the ecological performance (eco-efficiency) is in the foreground
- TSM is dominant
- Sustainability management is insufficient implemented in th corporate strategic management (see Balanced Scorecard)
- The strategies and processes of procurement management are essential for a company, in particular when it wants to move its sustainability politics and performance effectively

- CSR representation at the WSC is insufficient
- dominance of the environmental considerations → history
- According to Walter (2010) CSR requires the implementation of responsibility into the entire value chain → rarely given
- A differentiated discussion between stakeholders (local government, business, consumers, union) is necessary to accurately reflect conclusions and implications for planning and implementations, as well as to increase the visibility and credibility of CSR.



Conclusion and further research

- The ecological and social responsibility of a WSC depends crucially on how environmental and social challenges are addressed conceptually, institutionally and instrumentally, i.e. social learning processes are initiated and integrated into the long-term economic management.
- the implementation of the "Water Safety Plan" (WHO 2005)
- the extension of the existing filtration systems on ultra-and nanofiltration would ensure organic micropollutants (pharmaceutical residues, X-ray contrast agent) to be able to more efficiently eliminated from the surface waters



Contact

Dr. Marlen Arnold
University of Oldenburg
26111 Oldenburg

marlen.arnold@uni-oldenburg.de
+49(0)441-798-4469

Thomas Pieper MBA PhD cand.
University of Oldenburg
26111 Oldenburg
tpieper@aqua-sustainability.de

