A utilitarian notion of responsibility for sustainability

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Table of Contents

01.01 Sustainable Consumption & Lifestyles 1

Marianne Dagevos: A sustainable lifestyle is a hybrid lifestyle 1

Christine Eifler, Kirsten Diekamp: The difficulties of sustainable consumption of clothing 4

Hazel Nash: Reshaping consumption patterns through law and policy - Is it possible? 6

Anne Wiese, Julian Kellner, Waldemar Toporowski: Does Environmental Friendliness Matter? - A Discrete Choice Experiment Analysing Environmental Issues in Channel Choices 7

01.03 Sustainable Consumption & Lifestyles 10

Roberta Castri: Single-family house owners' perception, experiences and behavioural barriers in retrofitting their home - A case study from Ticino, Southern Switzerland 10

Georg Feiner, Lisa Bohunovsky: Initiating lifestyle changes in a community arena - Lessons learned from a pilot study in Austria 14

Janet Haddock-Fraser: In search of the elusive eco-consumer - Insights from a multi-enquiry approach investigating attitudes and behaviours relating to food purchasing 16

Markus Kunz: The «model of capital stocks» (Kapitalstockmodell) as a basic concept for the implementation of suffiency strategies 20

02.02 Theories of Sustainable Development 23

Helena Bender, Kate Judith: Does sustainability emerge from the relationships between scales? 23

Marie-Valentine Florin: Risk governance as a tool for sustainable development 26

Joachim Fünfgelt, Stefan Baumgärtner: A utilitarian notion of responsibility for sustainability 28

Jürgen Kopfmüller: Sustainable Development - universal or contextual guiding principle? 30

Merlina Missimer, Karl-Henrik Robèrt, Göran Broman: Are social sustainability principles possible? 32

03.01 Sustainable Regional Development 35

Mojca Kokot Krajnc, Ana Vovk Korže: Revitalisation of Old Industrial Areas is an Opportunity for Sustainable Regional Development 35

Stephan Schmidt: Action Capacity as a central criterion for sustainable regional development - The Swiss knowledge based strategy NRP under scrutiny 38

Kumar Ujjwal: Skill development towards sustainable livelihoods in India - Skill development for livelihoods enhancement 40

03.03 Sustainable Regional Development 43

Arthur Fallick, Kent Mullinix: Strategies to enhance the integration of agriculture within urban culture in British Columbia, Canada 43

Gabriele Fitzgerald: Green Hubs - Flow of ecofriendly action in community organisations and businesses to individual members' pro-environmental behaviours across home, work and community 45

Ingmar Gehrke, Magnus Fröhling: Innovations for sustainable biomass utilisation in the Upper Rhine Region (URR) - A comprehensive multi-disciplinary approach to assess regional sustainability 48

Johanna Jacobi, Stephan Rist, Monika Schneider: Ecological, Organisational and Institutional Challenges of Organic Cocoa Cultivation in Bolivia 51

Marketa Santruckova, Monika Hamanová, Mária Pákozdiová: Local community versus globalisation tendencies - Case study of Czech villages in Romanian Banat region 53

04.01 Corporate Social Responsibility / Corporate Citizenship 55

Colina Frisch, Markus Huppenbauer: Ethical leadership - a driver for corporate social responsibility? - A qualitative investigation of the experiences of executive ethical leaders 55

Cheryl Rodgers: Responsible Organisations need Responsible Leaders: Discuss and Define? 57

Stefan Schaltegger, Dorli Harms, Sarah Elena Windolph, Jacob Hörisch: Functional involvement in corporate sustainability management - Contribution of corporate functions to the sustainable development of companies 59

04.04 Corporate Social Responsibility / Corporate Citizenship 63

Marlen Arnold: Sustainability and responsibility in the German water economy 63

Barbara Dubach: Systematic stakeholder engagement a key to success 65

Christine Jacob: The Impact of Financial Crisis on Corporate Social Responsibility and its Implications on Reputation Risk Management 66

Daniel Jakobi, Mattia Godenzi: Raiffeisen Volunteers 70

Clemens Lang, Mariana Christen, Herbert Winistörfer, Alex Kunze: Implementation of the ISO 26000 Standard on Social Responsibility with the main focus of SME in Switzerland (Research project) 71

05.01 Institutionalisation and Sustainable Development 74

Ev Kirst, Daniel J. Lang, Harald Heinrichs, Arnim Wiek: Tasks of municipal administration from a multi-stakeholder perspective as a requisite for systemic sustainability assessment 74

Maud Orne-Gliemann: Studying social representations in water management institution building 77

Martina Padmanabhan: Identifying institutional gaps to transform the institutional landscape of agrobiodiversity - Rice cultivation at stake in India 79

Corinne Ruesch Schweizer: The Potential of (Shared) Mental Models in Understanding Processes of Institutionalising Sustainable Development in Schools 81

06.01 Governance of Sustainable Development 83

Basil Bornemann: Policy Integration through National Sustainable Development Strategies - Conceptual clarifications and empirical evidence from the German case 83

Serkan Gürlük: Sustainable management opportunities in an urban forest of Turkey 86

Allen H. Hu, Edward Saja Sanneh, Chia Wei Hsu, Momodou Njie: Prioritisation in climate change adaptation in Gambia using the fuzzy analytical hierarchy process - Adaptation to Climate Change in the Gambia 87

06.02 Governance of Sustainable Development 89

Brigitte Biermann: Lean and Effective Sustainability Reporting in SMEs 89

Minna Suutari: Opportunities towards sustainable decision making - Integrated financial environmental information for owners, members and other stakeholders 91

Floris van den Berg: The no harm model of sustainable development - Defining and grasping sustainable development 95

07/11.01 Economics & Industrial Ecology 101

Ralf Isenmann: Environmental Informatics for Industrial Ecology - Analysis of environmental ICT applications supporting eco-industrial developments 101

Georg Müller-Christ: Sustainable industrial parks as resource communities - Some reflection on the arising contradictions 105

Nikolinka Schakhramanyan: The impacts of mineral phosphorus prices and externality taxation on the use of organic phosphorus in US and their contribution for sustainable agriculture 107

Li Sheng: Foreign Investment and Urban Development: A Critical Evaluation - Sustainable Urban Development 108

07/11.03 Economics & Industrial Ecology 109

Stanislaw Belniak, Michal Gluszak, Malgorzata Zieba: Sustainable property investment - Development factors and barriers in Polish commercial property market 109

Paulo Bento: Innovation in Social Entrepreneurship Related to Poverty Reduction - Including Two Successful Case Studies 114

Christian Berg, Stefan Hack: Sustainability Driving Scarcities - The Potential of IT for Innovation and Value 115

08.01 Measuring and Evaluating Sustainable Development / Sustainability 117

Henk Hadders: Corporate Sustainability Performance from a Resource and Knowledge Perspective 117

Massimo Mobiglia: Sustainability evaluation on urban scale - Comparative analysis of existing instruments in order to determine a method for rapid evaluation in the preliminary stages of projects 120

Ugo Callistus Orazulike: The Elusive Nature of Indigenous People's Rights under International Environmental Law 123

Juliane Stark: Evaluation of Investments in Transport - the extended Cost-Benefit Analysis 124

08.02 Measuring and Evaluating Sustainable Development / Sustainability 126

Kristy Revell: The role of local authorities in stimulating pro-environmental behaviour change in the borough population 126

Stefan Schaltegger, Roger Burritt, Dimitar Zvezdov, Joanne Tingey-Holyoak, Jacob Hörisch: Role-determined information needs of sustainability management control 129

Maria Alice Stock, Antonius Budi Tjahjono, Maria Natalia Pacheco Rodriguez: Evaluating the promotion of equity in REDD+ - The case of Bolivia and Indonesia 132

08.03 Measuring and Evaluating Sustainable Development / Sustainability 135

Luca Canetta, Donatella Corti, Alessandro Fontana, Marco Taisch, Claudio R. Boër: Assessing the role of external stakeholders in setting the importance of sustainability and mass customisation indexes 135

Yiorgos Gadanakis, Richard Bennet, Julian Park: The use of Farm Business Survey to evaluate agricultural systems - The case of Anglian river basin catchment 138

Juri Lienert, Paul Burger: Applying the Capability Approach to Empirical Sustainability Research - Three Case Studies about the Valuation of Biological Resources in the Rural Livelihood Context of Nepal 139

Mónika Orloczki: Evaluating the sustainable development strategy of the European Union and Hungary through the sustainable development indicators 141

08.04 Measuring and Evaluating Sustainable Development / Sustainability 143

Izidora Markovic: Determining indicators of socio-cultural sustainability for protected areas - Example of National Park Plitvice Lakes, Croatia 143

Stefan Schaltegger, Dimitar Zvezdov: Ignorant or gatekeeper? What role do accountants play in the sustainability accounting practice? 146

Panitas Sureeyatanapas: The development of framework for corporate sustainability assessment - A case of sugar manufacturing 149

09.01 Sustainable Energy Systems: Facing the Energy Challenge 152

Reinhard Altenburger: CSR as a source of business and process innovation - Case study OMV 152

Vicente Carabias-Hütter, Sea Rotmann, Ruth Mourik: Cost-Efficient Steps towards more Sustainable Energy Systems - Behaviour Change in Demand-Side Management and Smart Living 154

Amal Kabalan: Implementation of the STEEP Model for Studying the Impact of a Photovoltaic System on a Remote Village in Kenya 156

Aviel Verbruggen: The sustainability of nuclear power - Facts and faith 158

09.02 Sustainable Energy Systems: Facing the Energy Challenge 160

Francesca Cellina, Nerio Cereghetti, Luca Pampuri, Michela Sormani: Challenges and opportunities for energy planning processes at the municipal level - Lessons learnt from experiences in Southern Switzerland 160

Borys Dodonov, Natalya Yemchenko: Energy Efficiency Indicators for Ukraine 164

Martin Schönhart, Johannes Schmidt, Stephan Hausl, Erwin Schmid, Johannes Rüdisser: Regional Energy Autarky - Opportunities, Costs and Ecological Consequences 165

10.01 Sustainable Supply Chain Management 168

Morgane Fritz, Sonja Ebner, Rupert Baumgartner, Karl Resel: Identification of environmental and social indicators for the supply chain in the electronics and automotive industry - Contribution within the consortium project* "Sustainability Data Exchange Hub - SustainHub" funded by the European Commission under the 7th Framework Programme 168

Thomas Benjamin Long: Managing Climate Mitigation Objectives in Suppliers 170

Angela van der Heijden, Peter Driessen, Jacqueline Cramer: Change Agent Sensemaking in a Sustainable Farming Supply Chain - From Economic to Innovative Routines 173

10.02 Sustainable Supply Chain Management 175

Christian Dietrich: Carbon Performance Improvement Initiative - Climate Protection Program for Supply Chain 175

Albin Kälin: Cradle to Cradle - an Innovation Path towards a circular economy 177

Dietlinde Quack, Rainer Grießhammer: EcoTopTen - the consumer information campaign for energy efficient devices and sustainable consumption 179

Erika Ustailieva, Albert Hollander: Sustainability Beyond the Corporate Boundaries - The approach of focal company 181

12.01 Sustainability in Higher Education 184

Jan Barkmann, Marko Böhm, Sabina Eggert, Hans Kaminski, Sebastian Koch, Simone Malz, Rainer Marggraf, Christina Schnell, Leti Sundawati, Susanne Bögeholz: Environmental and institutional economics education - A challenge for Education for Sustainable Development 184

Vicente Carabias-Hütter, Markus Ulrich: Experiences with a Game-oriented Approach to the Knowledge Transfer of Sustainability Indicators in Higher Education 188

Jan Cornelius Schmidt, Richard Beecroft: Method-based Higher Education in Sustainability - The Scenario Method and its Potential in Higher Education 191

Michael von Hauff, Thuan Nguyen: Challenges for a Sustainability Strategy of Universities - An Overview of Holistic Concepts and Assessments for Sustainability in Higher Education 194

12.03 Sustainability in Higher Education 197

Kim Ceulemans, Ingrid Molderez, Luc Van Liedekerke: Sustainability reporting in universities - A review of existing tools and instruments and directions for further research 197

Corinna Jung, Bernice Elger: Sustainability and environmental ethics - The IBMB-concept of bringing theory and practical cases together 200

Patrick Kunz, Ursula Frischknecht-Tobler, Brigitte Bollmann-Zuberbühler: Fostering Education for Sustainable Development (ESD) through Systems Thinking 202

Sandra Wilhelm Hamiti, Reto Hagenbuch, Bettina Hendry: Sustainability Transition of BSc-Curricula in Switzerland? - The BSc-IUNR-example 204

13.01 Sustainability Communication & Reporting 207

Michelle Graymore: Sustainability Reporting: have we got the right mix of theory and practicality for local actors? 207

Irina Lock, Peter Seele: Analyzing investor-specific sustainability reporting - Social and environmental risk communication 209

Marion Secka: Is an ideal CSR Communication possible? 211

AFS: Business Strategies for Sustainability - Current Research, Emerging Concepts and Future Challenges 215

Olivier Furrer, Carolyn P. Egri, David A. Ralston, Wade Danis, Knud Sinding, Jean-Pascal Gond, Nicola Berg, Mario Molteni, Tomasz Ochinowski, Francisco B. Castro, Irina Naoumova, Amandine Furrer-Perrinjaquet, Tevfik Dalgic, Frances Bowen, Ruth Alas: Corporate Social and Environmental Responsibility Practices and Performances in Europe - The Role of Stakeholders and Institutions 215

Rupert J. Baumgartner: Sustainability performance and business strategies for sustainability - How sustainable is sustainable business management? 219

Maren Schenkel, Jan Jonker: The Emergence of Strategies for Sustainability - Integrating sustainability into business strategy 223

Mirella Soyer, Jan Jonker: Strategic CSR and Firm Performance - Organising Alignment 226

AFS: Circumstances of Sustainability 227

Stephan Schmidt: The institutionalisation of sustainability and its transformation into practice - considering preconditions of sustainability as a basis for instrumental rules 227

Marius Christen: Circumstances of Sustainability - Sustainability between deliberative openness and ecological and societal constraints 229

Emily Schultz: Relating the normative foundation and descriptive circumstances of sustainability - Arguing for a normative feedback-loop 231

Lieske Voget-Kleschin: Integrating circumstances of sustainability into a formal framework of sustainability without lapsing into a 'theory about everything' 233

AFS: Implementing Sustainability in Institutions of Higher Education 235

Denise Bienz Septinus: Implementing Sustainability in Institutions of Higher Education - Practical Approaches and Challenges to Educating and Learning 235

Christine Bratrich, Michael Bürgi, Catherine L. Lippuner: Educating «Change Agents for Sustainability» - Three initiatives of ETH Zurich 237

Thomas Dyllick: Sustainability related course offerings in the University of St. Gallen Curriculum 239

Katrin Muff: Integrating sustainability across entire business programs - Evaluating the implementation of integrating sustainability across the BSL bachelor in business administration (BBA) program 240

Georg Müller-Christ: Integration of ESD as a quite normal organisational development process? 241

Dario Pirovino: oikos St. Gallen - students for sustainable economics and management - How a student initiative serves as a platform for students actively engaging in sustainability projects 243

AFS: Sustainability of Payments for Ecosystem Service 246

Jens Jetzkowitz: Payments for Ecosystem Services and Sustainability - A Necessary Debate 246

Stefan Baumgärtner: Payments for ecosystem services - for efficiency and for equity? 248

Barbara Muraca, Lieske Voget-Kleschin: Payments for Ecosystem Services (PES) - Axiological and justice issues 250

Franziska Wolff: International payments for ecosystem services - A governance strategy for sustainability? 253

AFS: Sustainable Development, Energy and Justice 256

Holger Schlör, Jürgen-Friedrich Hake, Wolfgang Fischer: Sustainable development, energy and justice - Measuring the distribution of Rawls's basic goods 256

Nicola Cantore, Alessandro Antimiani: Energy price shocks - Sweet and sour consequences in developing countries 259

Jürgen-Friedrich Hake, Holger Schlör, Wolfgang Fischer: Sustainable indicators for the assessment of energy systems - Tools for the development of innovative energy scenarios 261

Eddie N. Laboy-Nieves: The dilemma of electric generation in a small island - The case of Puerto Rico 264

Baris Özalay, Rafaela Hillerbrand: Integration of sustainable system indicators into an integrated assessment model for the valuation of the future global development 266

AFS: The contribution of System Dynamics to Sustainable Development 267

Matthias Müller: Introduction to the Additional Full Session "Systems Thinking & Sustainable Development" 267

Justus Gallati, Katrin Huegel: Policy modeling - A system dynamics approach for the analysis of incentive mechanisms to increase energy efficiency and to stimulate renewable energies 269

Matthias Müller, Silvia Ulli-Beer: Policy Implications from a System Dynamics Modeling Study of the Diffusion of Energy-Efficient Renovations in Switzerland 271

Silvia Ulli-Beer: How can deterministic simulation modeling enhance the scientific understanding of sustainability transitions? 274

01.01 Sustainable Consumption & Lifestyles

A sustainable lifestyle is a hybrid lifestyle

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Keywords: consumption patterns; sustainable lifestyle; hybrid; production; consumption; property; supply chain

Citizens who are serious about sustainability, translate this automatically into changes in their consumption patterns. These changes often are related to the purchase of food, energy, mobility and, to a lesser degree, to the purchase of garments, leisure and housing.
From the sixties onward, environmental awareness used to be synonymous with frugality, austerity and refraining. Health food was considered by the general public to be tasteless and dull, environment-friendly garments were seen as baggy and responsible mobility meant refraining from comfort. In short, living and consuming in an environmentally responsible way was considered dull, tough and drowsy.
In the last decade both in Holland and in other western countries, there has been a great effort going on to counter this representation and replace it by another image. As a consequence, the sustainable or green consumer is nowadays hip, innovative, authentic, stylish and fashionable. Buying and eating biological and local products is a sign of good taste and quality living. Today, with the help of internet and webshops, a growing supply of stylish and original products such as garments, home decoration and gadgets with a sustainable or green twist reach an ever growing group of consumers, who consider sustainability as a lifestyle that is synonymous with attention for quality, comfort and originality.

In my empirical research on social entrepreneurs in Holland it shows that both these entrepreneurs and their costumers - quite often organized in supporter networks or fan communities - experience that the boundaries between production and consumption are blurring. Many entrepreneurs create goods and services in collaboration and consultation with their customers. Many customers, on the other hand, are also producers from time to time. A good example of this practice are the local energy cooperatives, in which inhabitants of a neighbourhood, a village or a town unite in order to start producing energy by means of solar panels, windmills or biomass (or a combination thereof). Consumers then become producers and together they decide how their project will be realized. We can find other examples in urban agriculture and co-production between farmers and consumers. In these coproductions, the contact between producers and consumers is re-established, the consumer gets involved with the production process and gets to know the story behind it; as a result both parties (producer and consumer) lose their anonymity vis-à-vis one another.
In these cases, a sustainable lifestyle in practice means a hybrid lifestyle in which the boundaries between production and consumption, and between the producer on the one hand and the consumer on the other hand, are blurring and lose their meaning. Instead of reciprocal mistrust and distance, a relation of trust, involvement, interchange and reciprocal dependence can grow and flourish. When the supply chain from producers to consumers is shortened so as to remove any intermediary, anonymity between parties will diminish or disappear and stories about the products and their use can be

interchanged. In Holland there are various social and sustainable enterprises that can illustrate this phenomenon.
Furthermore, a sustainable lifestyle can be described as hybrid because the usual relations of property are being changed. Several entrepreneurs put into practice the selling of use not of property of certain goods and services (comparable with the lease concept). The goods remain the property of the producer who is the expert, knows the ins and outs of the product, and is therefore able to maintain, repair, modify or enhance it when needed. The consumers use the products, such as furniture, carpets, lighting etc. and they pay for the use of it.. After a determined amount of using hours, the producer retrieves the goods, reuses the raw materials and supplies the customer with the latest update of the product. This practice relates both to the cradle to cradle concept and to the 'excellent service' concept of suppliers.
Based on my research, I postulate that a sustainable lifestyle is a hybrid lifestyle in which the boundaries between producing and consuming are blurred. I propose that sustainable living and working (as shown by the examples quoted above) is specifically located in the civil society and should therefore be studied in this context.
The hybrid aspects of a sustainable lifestyle are best visible in the changing relations in the supply chain, the changing opinion regarding property and the emerging practice of co-creation and co-production. In my presentation and paper I will illustrate those changing practices with examples of Dutch practices of both social and sustainable entrepreneurs and their customers.

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The difficulties of sustainable consumption of clothing

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Keywords: images of eco clothing; cultural factors and sustainable fashion; barriers to consumer

In the last decade sustainable development have gained more attention in respect to everyday life and have become an acceptable part of lifestyle choice. However, the issue of sustainable or ecological clothing has not been taken up to the same extent as other ecological products - a fact that needs further clarification. Clothing, along with food, drink and home, belongs to our basic needs. Never before there were so many clothes produced as nowadays, accompanied by close attention to fashion trends and corresponding discourses about clothing and fashion in media. Sustainable clothing with fashionable design and innovative solutions initiates many discussions as well, although it has not yet become an integral part of the market. This article deals with the causes of the current low acceptance of sustainable fashion and textiles in Germany. The analyse shows the transformation of the image of sustainable clothing and consumers' current increasing demand for clothes that are both fashionable and sustainable. Based on the results of a survey we discuss a shift from the old clichés of eco-clothing in the 1970s to the new problems relevant to the production and consumption of sustainable clothing today. While recent academic research on textiles and the ecological aspects of sustainable clothing has developed considerably, the present paper focuses on cultural factors thus far less studied.
In our clothing survey women academics from universities and female managers were interviewed. The interviews took place between December 2010 and April 2011. The online questionnaire was sent to 1,725 people, of which 621 responded. This represents a response rate of 36.6%. The questionnaire consisted of two parts: a quantitative and a qualitative element. It dealt with the meaning of clothing for the self-image of the interviewees, with the role of fashion and consumption as well as with the respondents' perceptions of sustainable clothing. The personal statements of interviewees were integrated into the evaluation and add important individual perspectives and experiences to the data.

This paper concentrates on the following issues:
1. Clothing is a complex phenomenon. Among consumer goods it has an elevated significance that arises from the interweaving of functional, social and cultural aspects. Clothing has intimate contact with the body, it envelops the body and forms it. Alongside this intimate relationship with clothing there is one more important function in social interaction. The individual habitus, definite social structural traits such as social and ethnic identity and last but not least, "gender", are manifested through clothing as a form of a non-verbal communication. Complex interdependencies between the individual intimate relationship and the external visibility of clothing constitute its peculiarities. Both factors are embedded in a respective context. With the help of fashion and clothing individuals situate themselves as a part of a community, as well as aesthetically in context and time. The recognition of the social meaning of clothing is part of our cultural experience and belongs to the cultural memory of a society.
2. In the academic debate a negative image of eco-clothing, which developed in the 1970s, is considered to be responsible for the low acceptance of sustainable fashion and textiles. The previous eco-clothing won a reputation by consumers as unfashionable and ,,muesli-look" and influenced its acceptance negatively. In spite of ecological textile innovations and the expansion of clothing ranges, consumption of sustainable clothing has not generally improved in recent decades. The interviewees

perceive consideration of ecological issues as an integral part of their everyday way of life. They demonstrate an immense interest in and awareness of ecological issues. Knowledge of ecological issues goes along with efforts to behave "ecologically" in everyday life. But sustainable clothing plays a significantly more marginal role than ecological products in other spheres of everyday life.

3. Therefore the question arises as to whether comparatively lower consumption can be explained by the impact of clichés about ecological clothing. These data suggest that ecological clothing is hardly associated with old patterns of the "eco-look" from the 1970s and is no longer considered a niche product. In the qualitative part of the questionnaire the interviewees expressed their wish for a better, and particularly for a stylish range of sustainable clothing. It also becomes evident from the survey that the achievement of this wish faces various obstacles. The study makes it clear that a shift has occurred in the perception of ecological clothing. Consumers face contemporary structural problems of production and consumption of sustainable clothing: limited stylish offer, ill-defined retail outlets, lack of transparency about textile ecological developments as well as issues of pricing.

4. 78% of the interviewees indicated that they generally associate ecological clothing with natural fibers. Also many ecological producers emphasize the fundamental role of natural fabrics and regard them as desirable materials for ecological clothing. In spite of ecological issues caused by the production of cotton and wool, both materials are seen almost as synonyms for sustainable clothing. However, when one compares advantages and disadvantages of fabrics of natural and chemical origin, it turns out that the production of synthetic materials, especially polyester-based materials, prove themselves more ecologically friendly than the refining of renewable raw materials (Piegsa 2010: 75). This means that both consumers and producers have to let go of the idea of the superiority of 'natural' materials. By emphasizing the importance of technology in achieving sustainable goals, eco-tech fashion becomes a distinctly modern movement looking forward to the future of all fashion". (Scaturro 2008: 476).

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Reshaping consumption patterns through law and policy - Is it possible?

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Keywords: ecological modernisation; sustainable consumption and production; innovation; extended producer responsibility

A growing body of European law is developing which has at its centre the aim of sustainable consumption and production. Underpinning this framework is the belief that sustainable development can be achieved through the integration of environmental protection into all activities and controls. On this basis, the supranational institutions of the European Union (EU) establish their policies and legislative measures on the conviction that maintaining the capital of natural resources and protecting the environment from harm does not have to hinder economic growth. In this way, EU law can be seen to be embedded within the theory of ecological modernisation, which considers that the need for green growth presents western society in particular with a positive opportunity for ingenuity, economic efficiency and innovation.

This paper examines the EU's reaction to the financial crisis, established in policy through the Europe 2020 Strategy and its emerging EU Flagship Initiatives in light of the overarching objective of securing sustainable development. In particular, the paper considers the actions identified in these policies in relation to responsible growth. The paper considers the influences and constraints of ecological modernism on the scope and strength of measures to deliver sustainability. Using examples, the paper evaluates the extent to which secondary legislation and policy stimulates investment in and market uptake of innovation. It examines the role of Extended Producer Responsibility as a key instrument in changing patterns of consumption (and production) and the reasons for its limited success.

The paper concludes that consumption is a largely untackled area in the SCP regulatory agenda. EPR is not yet effective in altering consumption patterns which hampers investment in innovation and ecodesign. Whether sustainable consumption can realistically be achieved at all in a western consumerist society remains to be seen, although it appears that more radical steps in social reform are needed and a corresponding change in values.

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Does Environmental Friendliness Matter?

A Discrete Choice Experiment Analysing Environmental Issues in Channel Choices

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Keywords: discrete choice experiment; channel choice; sustainable consumption; environmental issues

Recent research has demonstrated that online retailing shows environmental advantages against the traditional brick-and-mortar retail. For instance, Weber et al. (2008) discovered that e-commerce uses and causes about 30 % less energy and CO2-emissions. These results prove problematic for brick-and-mortar and multi-channel retailers which do not want to endanger the existence of their stores. In particular the last mile, i.e. consumer's travel to the store or the delivery of a parcel to the consumer's home, is a main cause for CO2-emissions along retail supply chains (Edwards, McKinnon, & Cullinane, 2010). Hence, consumer behaviour, e.g. transport mode choice, has a huge impact on this result.

At this point, the question arises how influencing environmental aspects are on channel choices and how channel choices could be influenced. Well informed consumers might change channels due to this information. Besides, targeted information could help steering consumer behaviour towards more environmentally-friendly channels or transport modes. So far, research on channel choices has focussed on aspects like recreational, independence and convenience orientation (Schröder, & Zaharia, 2008) or price, accessibility and service (Chiang, & Li, 2010). The influence of environmental aspects on channel choices has been neglected. Incorporating this research gap, this paper answers the following research questions:

o How far do environmental aspects influence channel choice compared to other channel attributes?

o Which implications can be deducted for the management of online, multi-channel and brick-and-mortar retailers?

To answer these questions, we conducted a Discrete Choice Experiment (DCE), simulating different shopping situations for buying a t-shirt. DCEs are used to analyse the influence and importance of product attributes on choice probabilities (Train, 2009). Channel choices are quite complex, incorporating many channel characteristics. Therefore, we limited the DCE to four attributes with four different values that appear suitable for picturing the online and brick-and-mortar channel. Time and monetary aspects are particularly important in channel choices (Rajamma, Paswan, & Ganesh, 2007; Manski, & Salomon, 1987). To picture time constraints, the duration of the shopping trip and the availability of the product were used. Long travel times to the stores or long delivery times might hinder environmentally-friendly behaviour. The attribute for the duration of the shopping trip simulated trip lengths from 15 minutes up to 2 hours. The availability of the product varied from immediately up to five days. To display costs relevant to channel choice, we used the costs of the shopping trip, varying from 3 EUR up to 15 EUR. Moreover, we applied the CO2-emissions caused by the shopping trip to analyse the environmental aspect. The CO2-emissions vary from 0.750 kilogram up to 5 kilogram. It has to be kept in mind that this attribute mirrors a situation simulating a better informed customer than nowadays.

Every respondent was faced with four choice sets each consisting of four different choice alternatives. The respondents chose between generic alternatives (A, B, C, D). This assured that their decision was based on the values of attributes rather than on a given retail channel (i. e. online or brick-and-mortar retail). This enables a strong focus on the effect and importance of attributes. The survey was conducted in 2011 as a preliminary study for a major research project. In total, 27 questionnaires were collected within university employees and students in Germany.

The findings illustrate a significant, negative impact for all attributes ($p <= 0.001$). If the duration of the shopping trip increases, the probability of choosing any alternative decreases, for instance. Comparing the standardized values reveals that the costs of the shopping trip have the highest impact (-1.916), showing customers' sensitivity towards financial aspects. The effect of the product availability is the second-highest (-1.256). The duration of the shopping trip has a smaller impact (-0.881). Environmental pollution, measured by CO2-emissions, has the lowest impact (-0.857). However, comparing the values for the duration of the shopping trip and the environmental pollution reveals only small differences. Thus, the relevance of these two aspects for channel choice is nearly similar. Furthermore, there are indicators that women might react more sensitively towards environmental issues.

The results clarify that all attributes analysed are relevant for channel choices. Although environmental issues have an influence, shopping trip costs and product availability are more relevant. These attributes can be considered as a basic requirement to enhance environmentally-friendly behaviour. However, a more detailed look might be necessary. It can be expected that customers will be better informed in the future due to personal interests or information provided, for instance, by NGOs. On the one hand, more information could help to increase environmental-conscious behaviour, for example higher utilisation of public transport. On the other hand, a situation with better informed customers would have different consequences for retailers. This situation might favour online and endanger brick-and-mortar retailers. Retailers can learn from this and might react in different manners. In a first step they should try to improve the environmental friendliness of their processes without increasing costs. Mainly, this aspect is relevant for the online channel which costs are directly influenced by the retailer or its partners (e.g. parcel services). Furthermore, the costs are visible to customers (shipping costs). In general, online retailers are in a comfortable situation due to their better ecological performance. As delivery times are quite important for channel choices, express deliveries would be an option to shorten the delivery time in the online channel. Multi-channel retailers might provide information on the environmental effects of channel choices and could give recommendations on choosing channels for the shopping planned. Due to their various channels they could keep the customers within their system. However, customers might buy other or fewer products in various channels of one retailer. Brick-and-mortar retailers can highlight their performance for short-distance shopping trips (Wiese, Toporowski & Zielke, 2011).

All in all, these findings yield promising options for future research. For instance, a stronger focus should be set on different consumer groups and their affinity towards environmental issues in channel choices. In doing so, more detailed implications can be deducted.

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01.03 Sustainable Consumption & Lifestyles

Single-family house owners' perception, experiences and behavioural barriers in retrofitting their home

A case study from Ticino, Southern Switzerland

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Keywords: retrofit; energy advice services; house owners; behaviour; decision-making process

Energy-efficient upgrading of the existing housing stock depends significantly on whether private house owners decide to undertake energy-related retrofitting measures or not. This implies that the supply-side of the market promoting sustainable retrofit measures, needs to turn skilful enough to positively influence the demand-side in favour of energy efficient upgrading of buildings. Compared to traditional repair and maintenance measures, energy efficient retrofits represent, however, a more intricate assignment. The decision-making process by the house owner becomes thus a complex, but crucial passage towards the greening of the building sector and energy advice services turn into potentially precious tools for promoting behavioural changes in favour of sustainable retrofit projects1.
As the "Energy check-up" advice service run by the Institute of Applied Sustainability to the Built Environment (ISAAC)represents a well-established decision-making tool for energy-efficient upgrading of single-family houses in Canton Ticino,Switzerland, an assessment of this service was carried out. The survey involved 111 households and explored owners' attitudes, behaviour and experiences in energy-related retrofit projects. This allowed to gain an insight on how energy advice services are perceived and their recommendations implemented, as well as to identify some barriers, latent potentials and strategic implications for industry, policy-makers and energy advice services.

1. Introduction

In Switzerland and in Canton Ticino, the building sector accounts for approximately 40% of all the energy use. Replacement rates of the stock being rather slow, policies and programmes need to address the existing housing stock to curb down energy consumption2,3,4.

Not surprisingly, upgrading of existing building stock has received much attention from policy-makers at both federal and regional level in recent years. Efforts made focus primarily on turning sustainable retrofit projects into a cost-effective practise. Measures include:
o standardised energy-labels for buildings (MINERGIE, CECE)
o financial incentives for energy upgrading and renewable energy systems (the federal "building programme")
o energy-related policies and regulations within the building sector
o promotion of technological innovation and research in the field of renewable energies, construction material, etc.

o consumer information on retrofits (Energie Schweiz)

However, sustainable retrofitting continues to represent a rather rare practise in Ticino.

1.1 Sustainable retrofits - a change of paradigm

Energy efficient retrofits require an "integrated design approach" to the building. This much more complex assignment compared to traditional repair and maintenance measures, is pushing the construction market towards an important change of paradigm.

On one hand, the "supply" side is being urged to introduce a more systemic approach along with interdisciplinary know-how to the practises of industry itself - a task which is not easily reached by an industry which is characterised by fragmented professional roles and contractual relationships5. On the other, the "demand" side is expected to make informed choices that will privilege energy efficient products and services in order to reduce environmental impacts within the housing sector. Such a desired response, however, does not simply entail investment decisions dictated by an economic self-interest of the house owner6. It requires also supportive attitudes and environmental awareness, technical knowledge and capacities in project/site management and contractual relationships in construction7,8,9,10.

1.2 Energy advice services

Energy advice services (EAS) can overcome these obstacles and bridge current gaps at the supply and demand side of the construction market in favour of sustainable retrofit projects11. Using a preliminary energy audit of the building along with an economic and environmental cost-benefit analysis, EAS can grant an integrated design approach to the retrofit project from the start. This initial setting not only allows to better assist the house owner in the decision-making process, but can also orientate the craftsperson and drive behavioural changes of owners as well as professionals.

The evaluation of how ISAAC's "Energy check-ups" are perceived and thereafter put into practise therefore delivered useful information on why sustainable retrofit projects are being poorly implemented in Ticino.

2. Methodology

ISAAC undertook an empirical survey among house owners which benefited from the "Energy check-up" advice service between 2007-2009. Main aim of the survey was to identify the following issues regarding retrofitting measures:
o characteristics of the buildings for which "Energy check-ups" were requested
o what retrofitting measures were thereafter adopted (or planned) or not
o financial resources, planning and management of the refurbishment

o house owners' awareness and attitude towards energy issues
o information search by house owners concerning retrofits
o customer satisfaction of ISAAC's "Energy check-up"

Out of the 150 households which were contacted, 111 took part in the survey (74%).

3. Key findings

ISAAC's "Energy check-up" service was nearly unanimously (90%) perceived as "useful" and was praised mainly for providing a neutral assistance and acting as a support in the planning of retrofit measures. However, when it came to evaluating the way recommendations given out were actually implemented, a series of technical hitches emerged.

3.1 Behavioural barriers encountered

One of the main behavioural barrier emerging in this survey was that, after having been advised by ISAAC, most owners contacted directly a craftsperson to implement the retrofit project (57%), thus giving it a strong sectoral imprint. This conduct though reveals a weak awareness of the fundamental difference underlying conventional repair and maintenance measures and energy-related retrofits. The survey indirectly demonstrated that project/site management and contractual relationships easily overburden the house owner.

Unqualified to coordinate a multidisciplinary technical project and team, owners:
o opt for isolated, small-scale retrofit measures that can be easily supervised because of a manageable size (53%)
o rarely seek advice from an architect or an energy advice provider (integrated design approach)during the implementation phase (25%)
o overestimate their personal expertise and refuse additional investments for an external supervision

However, inappropriate project/site management:
o acts as a strong deterrent towards energy-efficient upgrading of buildings
o causes under-performance of retrofit measures and higher investment costs
o grows mistrust towards professionals
o impedes market transformation, as the demand side continues to request sectoral workmanship instead of an integrated approach to retrofit projects.

4. Conclusions

Policy-makers often assume that house owners will retrofit their homes if it is clear that it is in their financial best interest to do so, and programmes focus primarily on turning sustainable retrofit projects into a cost-effective practise. However, retrofits need careful and individual planning and, as this case

study demonstrates, management aspects of a retrofit project are not to be underestimated. They can actually make the difference between a good quality project following an integrated design approach to the building or conventional, poor quality upgrades of low energy performance. Thus, policy-makers and EAS in general should be more pro-active in raising house owners' awareness on the importance of an "integrated design approach" and be, above all, supportive of organisational aspects of retrofit projects, if they are to drive any market transformation and to play a part in behavioural changes of owners and raising retrofit rates.

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Initiating lifestyle changes in a community arena

Lessons learned from a pilot study in Austria

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Keywords: transition management; civic engagement; sustainable communities; lifestyle changes

Putting sustainable strategies into practice on a community level is a crucial issue in moving societies towards sustainable development. Policies aimed at initiating local and individual transition pathways towards sustainable development all too often did not achieve the expected level of change. The question remains how people should be addressed to make them change their way of living.

The InContext project (www.incontext-fp7.eu) addresses this question by focusing on the complexity of the contexts of individual behaviour and how these should be taken into account when devising policies for transitions to sustainable development. InContext distinguishes two strands of contexts determining the opportunities (drivers) and constraints (barriers) shaping individual behaviours related to sustainable development (Schäpke and Rauschmayer, 2012):

o the outer context to individual behaviour (e.g. politics, policies, infrastructure, social institutions, culture, habits, lifestyles)

o the inner context to individual behaviour (e.g. knowledge, personal interests, values, priorities and basic needs)

Besides theoretical and case study work, InContext implements three pilot studies in which a transition management approach is followed in order to support citizens to change their practices and lifestyles. These transition processes are built in a way that allows participants to reflect on their inner context in order to become aware of their needs as motivator for (un)sustainable lifestyles; to explore alternative strategies to fulfill their needs; to motivate them to try new strategies that increase their well-being and support a sustainable development.

In regard to collective, social learning, participants are supported to develop a shared understanding of sustainability issues in communities; to develop visions of how their community could be in a sustainable future and how to reach this vision.

The three pilot studies have been initiated in the city of Wolfhagen (Germany), Rotterdam (The Netherlands) and Finkenstein (Austria) and follow a common methodological approach (Wittmayer et al., 2011).

The conference paper will present the work done in the Austrian pilot study in Finkenstein. Finkenstein is one of the biggest Carinthian communities - in regard to population and area. It is situated near the Italian and Slovenian border. It is a community with a very complex structure, with tourism being dominant in the east part of the community and industry in the west. As a growing community the integration of new inhabitants is a central issue. The political landscape is fragmented.

For the pilot study in Finkenstein, a community arena (BürgerInnenforum) has been installed with 15 citizens having different educational and professional backgrounds, age, gender and origin. The 15 participants were selected through an intense stakeholder analysis. In four intense workshop sessions between March and May 2012 main unsustainability issues are discussed, a vision for a good life in the community is developed and actions towards this vision are being developed.

These participatory measures contribute to enhance the outer context to individual behaviour in changing collective strategies and practices. At the same time, through a process of joint reflection by and empowerment of individual members of the community, behavioural change at the local level is stimulated. The participatory methods chosen expecially aim at allowing for a reflection on the inner context (e.g. dynamic facilitation).
The process is accompanied by a transition team, which consists of representatives of all political parties and main sectors like tourism, business or education. This transition team does not influence the work done by the community arena, but is installed in order to back up actions developed by the transition team and to support their realisation. Moreover, working groups will be installed that may include further citizens and take care of the implementation of developed actions.
The presentation will build on the experiences and reflections on the participatory process of the community arena and adjacent fora. The strengths and weaknesses of the transition management approach will be discussed based on the experience in the pilot study. Ways of (re-)organizing civic engagement to contribute to sustainable development will be highlighted.

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In search of the elusive eco-consumer

Insights from a multi-enquiry approach investigating attitudes and behaviours relating to food purchasing

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Keywords: consumer behaviour; environmental attitudes; methodology; food

The UK population is increasingly aware of issues relating to man-made environmental degradation. DEFRA (2007) noted that 93% know something about climate change, 50% claim to understand the concept of carbon footprint, 62% claim to have become more environmentally active, and (Yates 2008) 78% have the strong desire to 'do the right thing' around climate change. This is not necessarily reflected in consumer buying behaviour at the product, issue of concern, or consumer typology-level however (Veleva 2010). Markets for eco-products are considered heterogeneous and niche (Finisterro do Paço et al 2009); consumer buying is not rational nor consistent (Collier et al 2010); attitudes may not translate directly into buying behaviour (Moisander 2007); respondents in directed surveys overstate their levels of environmental awareness, resolve and commitment (Vermeir and Verbeke 2006, Lane and Potter 2007, McDonald et al 2009); and information asymmetries may exist in consumer knowledge of environmental attributes (Heinzle and Wustenhagen 2011).

Given this lack of clarity in consumer attitudes and behaviour, Haddock-Fraser (forthcoming) investigated the merits of an alternative approach to the usual directed-survey techniques, using wide-scale content analysis of UK newspaper reporting, to investigate reporting patterns on corporate eco-activities relative to readership characteristics. The objective was to explore whether it enabled the evaluation of implicit (and maybe more realistic) attitudes towards the environment, through evaluating newspaper coverage of corporate-environmental activity. It was established that (i) large 'iconic' corporate-brand companies attracted most, largely positive attention; and (ii) most reporting of corporate environmental activity was undertaken by UK 'broadsheet' papers (Guardian, Times, Telegraph and Independent), corresponding to the population segments most likely to adopt pro-environmental behaviour (DEFRA 2008); (iii) British supermarkets were amongst the most highly visible in the press for their positive (and negative) environmental activities, although as with (ii) this was largely the 'broadsheet' press.

The findings suggested that there was an apparent lack of interest in corporate environmental activity (and therefore pro-environmental attitudes and behaviours) by broad swathes of the population, based on the extent to which such articles appeared in mid-market and popular newspapers read by 83% of total national newspaper readership (Press Gazette November, 2011). This reflects Hamilton's (2004) stance that newspapers present content according to profit making, political or journalistic goals, and that they need to respond strongly to consumer preferences (Gentzkow and Shapiro 2006). Hellyer and Haddock-Fraser (2011) state the news media could be pro-active in presenting messages for societal good - rather than merely driven by market-force - although Schudson (2003) notes the role of the media veers between an impartial source of information to a 'dominant force in the public construction of common experience and a popular sense of what is real and important', i.e. an influencer of readership opinion (Schudson 2003 p.13).

This research takes forward Haddock-Fraser's (forthcoming) findings, focusing on the UK food retail

sector, to explore the extent to which suppositions about the segmentation/niche nature of the eco-consumer is borne out by other forms of investigatory analysis, particularly large-scale survey techniques. The food retail sector was selected as it has been shown to be both very active in terms of environmental reporting (see Haddock-Fraser and Tourelle 2010, Haddock-Fraser and Fraser 2008, Haddock 2005), but also one which the vast majority of the population is aware of and purchases from. The research establishes and explains where differences occur between findings using newspaper coverage and large-scale directed survey results. The value arising from this is to (i) establish whether multiple modes of enquiry enable the development of a richer 'picture' of the eco-consumer in terms of their typology, motivations and readiness to engage in pro-environmental behaviour; (ii) understand whether the news media offers opportunities to educate and direct pro-environmental behaviours in consumers (following Schudson 2003 above), or whether it is reflecting its readerships attitudes and opinions already (following Gentzkow and Shapiro 2006, Hamilton 2004).

The methodology used in this research was to (i) undertake a NexisLexis search on all national newspapers for a two year period for all major food retailers in the UK (n=10), exploring environmental-related news coverage for each company (following methodology used by Haddock-Fraser (forthcoming)); (ii) evaluate data from large-scale customer survey data relating to food retail customers and environmental attitudes (e.g. Mintel 2009); (iii) triangulate data trends from (i) and (ii) relating to newspaper readership, newspaper coverage, supermarket frequented and explicit/implicit environmental attitudes and behaviours. Additional data sources such as such as government reports (e.g. DEFRA and NGOs (e.g. WWF)) will be evaluated in addition, to provide further depth of understanding.

Initial evaluation of the data suggests the following which will be evaluated for significance using inferential statistical methods:

1. Mintel data suggest higher proportions of broadsheet newspaper readers try to buy products with less packaging, buy organic, ethically sourced products and chemical-free products than mid-market tabloid and popular tabloid readers. This reinforces DEFRA findings (2008) and Haddock-Fraser (forthcoming).
2. However, Mintel responses relating to awareness and interest in environmental issues show little difference between newspaper readership groups, or supermarkets, and levels of interest and awareness are far higher than the newspaper coverage would suggest. Additionally, there seems little difference in respondents' perception of the role of the media in promoting environmental issues between readership groups, despite findings (Haddock-Fraser) that the broadsheet press were much more active in this regard than the mid-market and popular tabloid press.
3. In terms of attitudes by supermarket use, with the exception of Waitrose, there seemed to be little difference in consumers' attitudes and buying behaviours relating to the environment in general, despite large-scale press coverage for some. However, the discount supermarkets are least interested in organic or ethical products, as well as the most cost/price constrained, in line with least effort to present environmental coverage in the news media.
4. Mintel data suggests the news media has relatively equal influence on all supermarket shoppers despite widely differing press profiles of companies and newspaper. This suggests a limited role of newspapers in explicitly influencing attitudes and behaviours.

The research will probe these initial, somewhat contradictory, findings and establish further insights into the role of the news media in the UK in (i) whether they raise awareness of corporate-environmental activity, as well as environmental attitudes, or follow readership values; (ii) the extent to which news

media coverage reflects segmentation differences in readiness-to-buy against environmental criteria; (iii) whether news media coverage offers additional insights to large-scale consumer survey data on attitudes and behaviours.

This exploratory project has wider implications in terms of establishing the extent to which the news media is an influencer on the wider environmental-sustainability agenda -whether in a corporate context for other sectors and/or markets, or in terms of the role of news media in influencing the public's appetite for environmental policy.

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The «model of capital stocks» (Kapitalstockmodell) as a basic concept for the implementation of suffiency strategies

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Keywords: sustainable development; sufficiency; lifestyles

The sustainability strategy of sufficiency (also known as absolute decoupling) confronts us with the theoretical question about the possibilities of development in limited systems. On the practical level this strategy confronts our society with the question, how the addiction to growth-oriented development can be decreased or even eliminated. So, in theory, we have to discuss concepts of growth respectively development. One could also call this the emancipa-tion (un-chaining) of our societies from constraints regarding growth. Therefore renouncement is not the crucial theme, but the capability for renouncement!

The main thesis of this input is as follows: the question of the possibilities of growth cannot be asked on all levels in the same way. The argument is based on the "model of capital stocks" (Kapitalstockmodell, Lit. 1). According to this model, every stock of capitals of a given region consists of four forms of capital. Each of these capitals has its own terms of reference. The capitals cannot be aggregated and are not fungible without second level impacts. The capitals are: natural capital, man made (or engineered) capital, social capital and human capital. They describe the potential for the satisfaction of the needs and therefore for the creation of welfare in a given region. Somewhat simplified one could say that the two first capital forms are material or tangible, the latter two capitals are immaterial and intangible.

Because industrial production in the formerly so called developed countries is strictly linked with additional consumption of resources, theories of growth generally are concentrating on the correlation with "consumption". Therefore, in the debate about sustainable development we are focusing on the problem of resources and on the problem of developing economic indicators (like GDP) and the increasing consumption of resources and energy, that goes along with economic growth. However, this debate neglects the character of the mentioned four forms of capital, especially of social and human capital. In this context, the core issue about growth is totally different, because growth or accumulation of social or human capital (for example knowledge or solidarity or law, etc.) is not (or not directly) linked to an increasing consumption of resources. (And by the way, in many respects, social and human capital have a completely different approach regarding constraints and scarcities. When knowledge is exchanged, it is not diminished but shared and thus potentially growing.)

For this reason the question about managing sufficiency strategies has to be rephrased: Which mechanisms have, in the last decades, led to a shift from "immaterial" capital forms to "material" ones in our economic activities, and why? Are these processes reversible, and if so, how? Research results in this field are not unanimous. Approaches are available or under development, but in their sum they seem somewhat hit-and-miss. Worth mentioning are for example Wolfgang Sachs' "4 E's" (Entschleunigung [decrease in speed, de-celeration], Entflechtung [deconcentration, de-merger, unbundling], Entkommerzialisierung [decommer-cialisation], Entrümpelung [clearing out, de-cluttering]). These are hints that can be developed against the background of the Kapitalstockmodell to a thesis as

follows: A crucial development in human culture is the replacement of human work (as a human and social capital asset) by energy (as a natural and engineered capital asset), i.e. the shift from "immaterial" to "material" capital forms. On the level of cultural theory, it is the development of the "industrial revolutions" of the last centuries, that made it possible to replace and amplify human activities by non-human energy. Simplified, one could say, that this was the beginning of the mentioned coupling of production and resource consumption.

Against the background of this thesis, research about sufficiency strategies should shift to another focus: Instead of the emphasis on renouncement (id est of the focus on system limits) we should make a shift to a more qualitative research about lifestyles, which promise a better quality of life by consuming more immaterial goods and less classical, non renewable resources.

The approach of focusing on energy intense processes as a starting point to the implementa-tion of a "Sufficiency Economy" does not solve the problem immediately. At least it opens new perspective that are potentially seminal. One approach is the research regarding alternative measurements of growth. Reducing this to the "gross national happiness" may be somewhat controversial. Despite these shortcomings, these approaches may lead to a re-evaluation of simple growth indicators. At the minimum, they support us in finding new perspectives regarding growth and development. ("When something grows is gets bigger. When something develops it gets different." H. Daly) Another approach focuses on the importance of social capital. Social capital has its special meaning as it sets the social frameworks which are deciding about the use of the three other capital stocks in production and consumption processes.

This list is not complete. The relating activities in research are not completed yet by any means. Not everything coming from this will be new. It is important, however, that the necessity of "sufficiency strategies" in modern societies is recognised as an important means to develop our societies. On the other hand, it has to be mentioned, that this is not intended to negate the past development and the former development should not be destroyed.
TINA - There is no alternative. And it will not be the trail back to stone age but to new forms of prosperity.

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[2] This ist only a basic rule: Globally seen there are also opposite trends. But most of them are regionally limited exceptions of this rule. Cf. from the big number of sources for example:
Herman Daly: Sustainable Growth: An Impossibility Theorem, in: Valuing the Earth, MIT, Massachusetts, 1993,

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02.02 Theories of Sustainable Development

Does sustainability emerge from the relationships between scales?

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Keywords: sustainability; emergence; scale; relationship

Sustainability has become a 'catch all' term that has been attached to products, processes, companies and movements, but may be losing any relevance to society in the process. As Norton (2005) points out, the conceptual and linguistic framework within which sustainability is understood is important. We apply systems thinking and emergence theory and take into account the importance of scale to present an integrated way of thinking about sustainability that identifies a point of interaction where policy and discussion might be better directed.

We consider sustainability as an emergent quality of a system that occurs when the interactions within the system and between the system and its environment are nourishing. This conception is useful for three key reasons: it indicates the kinds of relationships individual humans and human groups need to be engaged in at the micro level; it provides a guide for the monitoring functions that might be needed at a macro level to recognise emergent patterns; and most importantly, it places emphasis ultimately neither upon the micro or the macro scales but upon the relationship between these two. By drawing attention to the interaction between the two we seek to stimulate discussion on how these best can speak to each other and facilitate the emergence of sustainability.

Systems thinking illuminates two key aspects that help in thinking about sustainability: boundaries and relationships. Thinking of sustainability as a quality of a system highlights the boundaries we draw, the negotiation we undertake between reality and our efforts to describe and understand it, as well as the interactions between and within systems that need to be nourishing and nourished. It is through these multitudes of nourishing interactions that we believe sustainability emerges. Nourishment in this context is the active support of a system by its environment and the elements within it so that it may persist, like the active role of muscles in holding a pose. Emergence theory tells us that it is through interactions at a micro scale, between elements of a system and without control from above, that emergent properties may occur. Emergence however, can only be detected at the scale above where the individual interactions are occurring. Hence, the relationship between sub and super systems is a critical focal point for thinking about sustainability.

There are two processes to consider as we engage with this model of sustainability: those that are required to support emergence, and those that are required to ensure that the emergence leads to sustainability. Emergence is fostered by complexity, risk, and reduced control from above. For sustainability to emerge, the interactions between and within systems need to be nourishing, and some form of feedback or monitoring is needed to assess whether this is being achieved.

Emergence is more likely to occur in a system with greater diversity and complexity where there is more interacting and sharing of information and minimal outside control. The outcomes from such interactions are unknown and may be perceived as chaotic and risky (Miller 2010). However, it is through risk taking that we discover new and unexpected outcomes or pathways. Some recent examples in science show how, by trying experiments that were expected to fail new discoveries that challenged accepted theories were discovered. Examples include Nobel gases that react despite all earlier predictions (Hargittai 2009), and spontaneous reactions that go in both directions despite the second law of thermodynamics predicting that they should only go in one (Tabony 2006). If we reduce our desire for security we create the freedom for alternatives, including sustainability, to emerge from an evolution of interactions. We judge if an emergent property is sustainable or not depending on whether the risks are beneficial or harmful. Consequently a closer look at the human decision making system is a critical part of this model.

In human decision-making systems there is a similar need for diverse contributors and opportunities for risk to facilitate the possibility of emergent outcomes. Emergence is more likely when each individual makes decisions based on the information they gather about their local environment and relative changes (Johnson 2003). We think looking for some measure of nourishment will be one way to establish whether sustainability is an emergent outcome. Nourishment will primarily occur at the micro level but those doing the nourishing and within the system, are unlikely to be able to judge whether their actions are resulting in sustainable outcomes. Monitoring at the macro scale is where sustainability is likely to be detected and feedback to the micro scale will facilitate whether current practices continue or are changed. So, to foster sustainability, not only do we need room for risk taking but a framework that is responsive to whether nourishment can be detected at a macro scale.

There appears to be a tension between what is needed at the micro scale and the role of the macro scale. The micro scale needs risk and diversity for the possibility of sustainability to emerge. The macro scale is needed to detect the emergent patterns and provide feedback, but if it begins to play a directive role, emergence may be stifled. Emergence theory suggests that the best kind of relationship between the micro and macro levels is one where the macro level merely monitors and provides information, so that individuals and groups at the micro level can be informed but autonomous in their actions. This is risky and in conflict with current practices. The act of monitoring and feedback is important, but where should the decision making take place? How to manage and care for this interactive space between the scales is the challenge we are posing to the sustainability community.

For the emergence to focus towards sustainability the conversation between micro and macro must remain open and vigorous to both enable risk taking and ensure that the risks are targeted towards nourishment. This paper will look further at this space and pose the questions that we think need further exploration if this model is accepted as a possible path towards emerging sustainability.

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Risk governance as a tool for sustainable development

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Keywords: risk; governance; risk governance; risk management

Risk governance is defined as the identification, assessment, management and communication of risks in a broad context. It includes the totality of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated, and how and by whom management decisions are taken and implemented.

The International Risk Governance Council (www.IRGC.org) has developed concepts and tools for risk governance, which will be briefly presented, emphasising:
o the role of context in risk assessment, management and communication
o the necessity to involve stakeholders, at appropriate levels and times
o the need to appreciate that risk management is as much the outcome of risk assessment as the outcome of an evaluation of the need to manage a given risk.

Risk governance is thus an effective tool for:
o understanding people's values, motivations and behaviour
o balancing risks as well as risks and benefits
o resolving trade-offs
which are important components of effective sustainable development strategies.

Through these ideas and concepts, this presentation intends to equip policymakers and scientists with some concepts to understand how to bridge the gap between science and policymaking. It will be illustrated with example of how these methods applied to the governance of complex, uncertain or ambiguous risks has improved the dialogue and enabled sustainable solutions to emerge. Examples will be taken in the fields of:
o bioenergy policies: risk governance guidelines for resolving trade-offs
o fisheries depletion: risk governance deficits
o megacities: contributing factors to emerging risks

IRGC is an independent organisation whose purpose is to help the understanding and management of global risks that impact on human health and safety, the environment, the economy and society at large by:
o developing concepts of risk governance that have relevance across different risk types, problem areas, organisations and countries
o anticipating major risk issues and improving the understanding and assessment of them and the ambiguities involved;
o providing policy recommendations to key decision makers in government.
In achieving its mission IRGC seeks to work with governments, industry, NGOs and other organisations.

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A utilitarian notion of responsibility for sustainability

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Keywords: sustainability; responsibility; utilitarianism; basic needs; discounting; natural resources; Pareto efficiency; ethics

Sustainability is a very broad conception of justice. As such it poses an imperative on currently living collective and individual actors. This imperative of sustainability implies intra- as well as intergenerational justice. More specifically, as defined by the Brundlandt Commission (WCED 1987), sustainability refers to the satisfaction of basic needs of present and future generations. To realize sustainability, the present generation ought to act sustainably which implies at least two obligations: one directed towards currently living individuals and the other towards the future.

Acting sustainably means to take specific actions in accordance with the norm of sustainability in a concrete action context. An action context is characterized by a feasible set of actions, given system structures and dynamics, and knowledge of the system. This may create a gap between the imperative to act sustainably and the action context since the set of feasible actions and the knowledge of the system may be limited. This paper aims to fill this gap by conceptualizing an actor's responsibility for sustainability.

The concept of responsibility - as it has emerged from practical philosophy, political science, and law - links abstract norms with specific contexts. One feature of responsibility is that it is limited by available knowledge, power to act and the rights of the responsibility or duty bearer. Therefore, the imperative of sustainability cannot imply a responsibility of current generations to attain a particular future state of the world. It does imply, though, the responsibility to use the best available knowledge and power, according to Brundtland (WCED 1987), to meet the needs of the present without compromising the ability of future generations to meet their needs under the presently given conditions of knowledge, power and rights of the present generation. Knowledge and power thus limit responsibility.

Now, how far reaches the responsibility of the current generation given its knowledge and power to act are limited and given that it has rights itself? We analyze this question normatively by limiting the responsibility for Brundtland sustainability with Singer's principle. Singer (1972) basically claims that minimizing suffering due to unsatisfied basic needs is morally more important than maximizing wants. It is thus a slightly modified version of the utilitarian principle of maximizing total happiness. We discuss Singer's principle more deeply and link it to the notion of sustainability. The principle normatively completes our utilitarian notion of responsibility as it precisely defines its limits.

To illustrate the meaning of the utilitarian notion of responsibility thus developed, we apply it in a simple economic model and relate it to established criteria for the assessment of intertemporal societal choice, namely Pareto-efficiency, (discounted) utilitarian welfare maximization, and sustainability. The model comprises two non-overlapping generations. They share a natural resource from which they produce a consumption good that allows them to satisfy their basic needs. We thus model a simple resource allocation problem, however with a unidirectional power structure: the first generation can decide which share of the resource to use for itself and which share to hand over to the second generation. This simple setup allows us to analyze and compare which allocations satisfy different normative criteria.

We have thus developed and formalized a utilitarian notion of responsibility which is inspired by

Singer's (1972) principle and the Brundtland Commission's concept of sustainability (WCED 1987). Our results show that sustainability and responsibility for sustainability are equivalent if and only if sustainability is feasible. If it is not, there still exists a responsible allocation which is also Pareto-efficient. Further, the utilitarian welfare maximum with no discounting always fulfills the criterion of responsibility. Discounting may be rsponsible to a certain extent if sustainability is feasible. If sustainability is not feasible, discounting future satisfaction of basic needs is not responsible.
Our analysis demonstrates that reponsibility can be clearly and unambiguously conceptualized. Such a concept of responsibility is, albeit simple, neither trivial nor redundant, but adds specificity to the discussion about sustainability in two respects: (1) it clearly specifies how to act if sustainability is not feasible; (2) in any case, it specifies the balance between the claims of present and future generations.
With these achievements, also the limits of our analysis are clear: we have built on a specific idea of sustainability and on a specific ethics, both of which focus on the satisfaction of basic needs (and, thus, go together very well). For other aspects of sustainability they are less well suited, and other notions of responsibility will be needed.

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Sustainable Development - universal or contextual guiding principle?

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Keywords: sustainability; theory; operationalisation; human rights; climate policy; universality; context-dependency

Societal guiding principles should provide basic goal orientation to shape development pro-cesses. Since more than 20 years, a global consensus exists that sustainable development marks such an orientation, and several attempts are made to implement it as an answer to serious problems. Although, still substantial controversies exist about a precise definition of goals and strategies to achieve them.

Nevertheless, current sustainability debates focus on practical implementation activities rather than conceptual or theoretical issues. Special attention is drawn to activities such as local agenda 21 processes, United Nations decades on education or water issues, the transformation of the energy system or the social security system towards more sustainability. The remaining theoretical dealing with sustainability is focused rather on the suitable design of research (prerequisites and modes of inter- and transdisciplinarity) than on answering the fundamental question about what is, could or should be the real core of sustainability. However, a lack of theoretical foundation for the justification and implementation of the principle is stated, above all in view of the still existing variety of competing sustainability concepts and the suspected arbitrariness (siehe z. B. Grunwald 2009, Schulz et al. 2008).

This calls for more theoretical reflection in order to strengthen mainly two elements which are still not sufficiently distinctive in the sustainability debate: the identification of a common homogeneous viewpoint of the principle, as a suitable basis for both differentiation and delimita-tion, and the abstraction from occasional case perspectives towards common and general identities and elements. The goal of such a theoretical and conceptual work should be to provide well-founded orientation and action knowledge for stakeholders and decision makers to improve practical sustainability operationalisation. For this, a suitable combination of pre-definitions of the principle being inevitable for every implementation, and openness for changing developments, contexts and knowledge is required.

Starting point of this presentation is that, apart from searching for a common thematic core of sustainability, particularly the issues of its legitimation, scope and addressees need an improved theoretical basis. Based on an outline of what is understood as the "global dimension" of sustainability, the presentation deals with the question to which extent the principle is universally valid or claims universal validity, and where it can be positioned between universality and contextuality. Using the human rights example, which is closely linked with sustainability, possibilities and constraints of universally valid guiding principles will be reflected. Here, the approach of a ,,relative universality" is discussed as a compromise solution, based on the idea of universally valid minimum requirements for human rights, beyond which differentiation according to specific contexts is possible. Using the example of international climate policy, this approach will be illustrated and transferred to the practical implementation of political sustainability goals. By means of a generalizable operationalisation scheme, universal and context-sensitive elements will be distinguished and it will be shown how such a differentiation can be operationalised and practically implemented.

Against this background, the main argument of the presentation will be that the sustainability principle has to be located between the poles of universality and contextuality depending on the level of operationalisation. Based on this, with respect to future research and action requirements some crucial questions regarding the design and implementation of such an operationalization scheme in detail and its transferability to other topics will be outlined.

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Are social sustainability principles possible?

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Keywords: social sustainability; backcasting; framework for strategic sustainable development FSSD; sustainability principles

Scientists of various fields support the conclusion that society is currently on a long-term unsustainable course (Steffen et al. 2004; MA 2005) and that to address the sustainability challenge, trans-disciplinary, trans-sector, and other interactive approaches for a more robust systems perspective on sustainability will be needed (Huesemann 2001; Robèrt et al 2002, Hjortha and Bagheria 2006).

In an attempt to create a trans-disciplinary, systematic approach to sustainability, a group of scientists, including some of the authors, are developing a Framework for Strategic Sustainable Development (FSSD), which utilizes a robust definition of sustainability, independent of type of activity and scale. The framework has been developed in a 20-year consensus process including theoretical exploration, followed by refinement and testing in learning loops between scientists and practitioners from business and government (see, e.g., Robert 2000; Broman et al. 2000; Robert et al. 2002; Ny et al. 2006). The framework has been applied by a variety of business leaders (Electrolux 1994; Robèrt 1997; Anderson 1998; Nattrass 1999; Broman et al. 2000; Leadbitter 2002; Matsushita 2002; Nattrass and Altomare 2002; Robèrt 2002) and policy makers (Cook 2004; Robèrt et al. 2005; James and Lahti 2004; Gordon 2004) to create a systematic approach to challenges and opportunities from a sustainability perspective.

The framework is based on the idea that a strategic progress towards sustainability needs to have a robust definition of 'purpose' or overall goal. The overall idea is to allow such a robust definition to inform back-casting planning and selection, development and combination of other methods and tools.

However, it has been shown that the social sustainability aspect of the framework, its attempted definition of social sustainability, is not equally developed to cover all aspects needed for the definition to really be operational (Missimer et al. 2010). The under-development of the social dimension of sustainability is not just an issue in the framework, but also in the larger sustainability discourse (e.g. Davidson 2007, Colantanio 2008)

Before such a definition of success (in this case 'sustainability of the social system') can be attempted, we need to understand the systems level enough (in this case 'the social system'). A recent paper (Missimer et al, manuscript) has identified six essential aspects to sustain in the social system. The aspects are competence, benevolence and integrity as well as self-organization, diversity and learning. The first three aspects were identified as aspects necessary in creating trust (via trustworthiness), which has been identified as essential for a social system in the social science literature. The last three aspects have been extensively discussed in literature on complex adaptive system. These six aspects have been identified as crucial to an understanding of the social system as intended through the systematic perspective of the framework. As the framework operates on principles with the criteria of

being:

o Science-based, that is, compliant with relevant scientific knowledge available to date
o Necessary for sustainability, that is, to avoid imposing unnecessary requirements and to avoid confusion over elements that may be debatable.
o Sufficient for sustainability, that is, the SPs taken together should cover all relevant aspects
o General, that is, people from various societal sectors and scientific disciplines should be able to understand and use them
o Concrete, that is, capable of guiding actions and problem solving,
o Distinct, that is, mutually exclusive to facilitate comprehension and monitoring (Robèrt, 2000; Ny, 2006)

This paper discusses the possibilities and challenges of designing social sustainability principles based on the idea of avoiding basic mechanisms for destruction. Over and above understanding such basic mechanisms of destruction, we may need to add something. Maybe ethical dimensions will put such demands onto the approach to really be operational. Another example could be if a social system is already un-sustainable; then we may need to look for principles not only to avoid further destruction, but for reconstitution. The paper adds to this discussion as well as discussing what basic mechanisms of destruction might look like, thereby contributing to the further development of the social aspects of a systematic and strategic framework for sustainable development.

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03.01 Sustainable Regional Development

Revitalisation of Old Industrial Areas is an Opportunity for Sustainable Regional Development

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The problems of old industrial areas are encountered by European industrial cities in recent years. Technological advances and globalization have led to a decrease of industry and the emergence of old industrial areas with many environmental, social and economic problems [1, 6, 9, 10]. While the number of people in cities increases and the growing need for housing and other facilities has influence on losing green areas and their lost affects the increase in global change and reduce the quality of living in cities, while old industrial sites in urban environment are degraded and have no functions in the area.
A common policy of the European Union strives to ensure sustainable development in cities. Leipzig charter on Sustainable European Cities [8] encourages Member States to the revitalization of old industrial areas, since these allow the elimination of contamination and environmental degradation, they contribute to the preservation of green areas, prevent urban expansion on agricultural or forest areas and they allow regional economic growth based on the needs of the regional environment [7, 12, 13]. With the revitalization of old industrial sites, we do not only guarantee a sustainable development, but also realized the requirements of the Treaty of Lisbon [14] and Europe Strategy 2020 [5]. Both strategies emphasize the high quality of life in cities as well as ensuring the competitiveness of European economy. At the global level with the sustainable revitalization of old industrial sites the impacts of climate change is reduced.
In this paper we will define the concept of sustainable revitalization of old industrial areas and its importance in providing re-sustainable regional development. First, we will present the basic model for sustainable revitalization of regional economic development and then we will identify indicators of sustainable revitalization, which can be used in evaluating the achievement of sustainable regional economic development through revitalization of old industrial sites. Until now, most of the indicators were developed for assessing achievement of sustainability in the establishment of sites for housing and renaturation by creating green areas for recreation and relaxation of the city's residents [2, 3, 4, 13].
Model for evaluation of indicators of sustainable revitalization will focus on the sustainability of the re-evaluation of the economic development area, taking into account the quality of work environment and corporate responsibility. These requirements dictate also the strategy of the European Union 2020, where it is necessary to establish a sustainable regional economy by reactivation of the competitiveness and economic development in Europe [5].
An effective economic growth with impact on regional and sustainable development in urban areas with brownfield sites can be achieved by taking into account the needs of the regional environment. Therefore, we advocate the need to build sustainable development based on environmental sustainability and on the knowledge of the geographical characteristics in the area. The basic model of

environmental sustainability was developed by O'Riordan, who explains that the economy is in the first stage a subsystem of human society, which is itself in a second step, the subsystem of integrity of life on Earth (the biosphere). O'Riordan's sustainability model shows the economy as an integral part of society, which is bounded and depends on the environment [4, 13].

We complemented the environmental model of the sustainability with the component of space. Space in our case is the nature and consists of physical geographical factors such as water, soil, air and surface. The knowledge of the basic characteristics of physical geographical factors has enabled us to re-establish regional development, which will be based on the supporting capacity of the environment which could actually preserve the natural balance of nature and self-cleaning ability, which helps to prevent re-pollution. Component of the environment is an environment that is polluted, decontaminated and abandoned due to industrial activities and must be revitalized. Social component of the revitalization is defined by society as a whole in a defined environment. The society covers all residents of the defined area; because of the involvement of all stakeholders in the revitalization of old industrial areas we can achieve the efficient development, which is a compromise of different needs. At the lowest level of created sustainable development model is the economy. The economic re-development of old industrial sites must take into account physical geographical characteristics of the area, that there will be no pollution, thus allowing the efficient use of renewable energy to lower costs of energy consumption; implementing and meeting the needs of the local environment and the economy should also be socially responsible. The economy must be well designed with those activities that can employ as many local people. There must be established a possible link between activities in the area and the principles of industrial ecology should be followed. With such designed economic system material and energy flows are reduced, pollution is prevented and the social sense of place is strengthened. With regard to all four components sustainable revitalization of old industrial areas can be achieved and sustainable regional development can be ensured, which will be environmentally friendly, socially and economically competitive.

Based on this developed theory of sustainable revitalization of old industrial areas for regional re-development, we developed a model of evaluation of sustainability indicators. Indicators were defined on the basis of a literature review and identified by the hierarchical level.

With regard to environmental sustainability, together with the component of space we can achieve sustainable revitalization of old industrial sites and establish a successful regional development of the area. This should be considered in the revitalization of areas in Eastern Europe, where several ongoing revitalization of old industrial areas and most do not take into account the principles of sustainability, as neither the EU's policy for regional development in its recommendations for the use of financial incentives does not require planning and implementation of sustainable development in the revitalized areas [12].

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Action Capacity as a central criterion for sustainable regional development

The Swiss knowledge based strategy NRP under scrutiny

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Keywords: sustainable regional development; action capacity; instrumental rules

The focus of this paper is on questions regarding first, the facilitating and fostering of sustainable development processes on a regional scale in general and second, the strengthening of action capacities of individual as well as collective actors being in charge for the composing of these development processes in particular.
I base my argument on the deep interlinkage between the institutionalisation of sustainability and the strengthening of the action capacity of actors respectively the extending of their scope of action as a central element of this institutionalisation. Strengthening a person's or institutions action capacity in the context of a good life or sustainability means besides the consideration of the internal resources and thus, the capabilities on an individual layer an actor is equipped with, to influence or change the external or social aspects of this individual or collective actor. Thus, I emphasize a dual pattern to analyse actions: individual and external aspects on a societal layer as central elements to analyze actions. Robeyns (2005, S. 112) takes up this point and explains that ,,the parameters that policy or social change can influence are the means of the capabilities, and hardly ever the capabilities directly".
With this theoretical background in hand I try to answer the question (I):
Can action capacity fulfill the function as a central criterion of a sustainable regional development?
A common approach to operationalize action capacity is to name instrumental rules framing on the one hand its theoretical background and on the other its practical application. The instrumental rules are represented by four central aspects derived from the normative as well as descriptive components of sustainability. First, the processes of sustainability are closely interlinked with the capacity to change. These include the ability to adapt to changing circumstances as well as the ability to create new development paths respectively to innovate (cf. Rauch and Tröger, 2004, p. 2). Second, the process of a sustainable development requires a stable knowledge basis of the individual and collective actors to understand or to sharpen the concept of sustainability and to diagnose sustainability problems as well as to find suitable and practicable solution strategies (Dybowski and Haertel, 2003, p. 75ff). In this context knowledge transfer means not only to distribute knowledge between persons and places, but also the identification, communication and exchange of diverse forms of knowledge. The third aspect is the capacity to selforganize, what points to the character of sustainability as a societal learning process. It is crucial for individual as well as collective actors to participate in or to shape the learning processes. The capacity to selforganize is constituted by the mode of monitoring - the interaction between the actor and its environment - and the mode of reflexivity, what includes the perception and the enunciation of problems or drawbacks as well as the ability to adjust actions to varying circumstances. The fourth and last aspect is represented by the opportunity to enter and establish partnerships, alliances and to create networks. Networks and partnerships are the basis to plan and implement sustainability strategies. These four aspects serve as a theoretical basis to answer the following question (II):
In what way is the addressing of the instrumental rules on a regional level proper to integrate sustainability as a societal ideal for action?

This theoretical endeavor found its practical application within the New Regional Policy (NRP) of Switzerland, a knowledge-based development strategy representing a paradigm shift from a hard, quantitative oriented policy to a more soft and qualitative oriented. This case is to be applied to show how a normative shaped scheme like this of the instrumental rules can be transferred into practice and which performance it can develop. The application of the theory gives some indication of its evidence and of the insights which can be gained.
With the qualitative orientation of the NRP a strengthening of the regional level as well as an increased responsibility of the regional actors for the development of the region comes along. A new focus on innovation, entrepreneurship and competition of the NRP recently completes the central meaning of knowledge and capacities. ,,Ziel von regiosuisse ist es, ein Wissenssystem zur NRP und zur Regionalentwicklung aufzubauen, das die in der Regionalentwicklung tätigen Personen in ihrer Arbeit unterstützt und diese motiviert, lernfähig, kreativ und innovativ zu bleiben" (regiosuisse, 2010). All in all the frame conditions of the NRP proofed to be eligible for an application of the elaborated theoretical approach and the answering of the two questions regarding the action capacity as the central criterion of sustainable development as well as the operationalization of the same by instrumental rules.

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Skill development towards sustainable livelihoods in India

Skill development for livelihoods enhancement

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Keywords: developing skills; creating opportunities for the poor

Poverty and economic insecurity are the major challenges in many parts of India where the poor suffer from deprivation in multiple ways such as low income, insecure livelihoods, inadequate social infrastructure and poor access to the resources. The economy of India is largely based on agriculture however its growth is hampered by small landholding, low productivity, drought and chronic flooding. There are emerging need for livelihoods diversification and provide alternative livelihoods opportunities for poor to reduce dependency on agriculture and sustain in the changing economy. Underprivileged groups live predominantly in rural areas and they often have smaller landholdings or less productive plots of land that is inadequate for their livelihoods. There is lack of livelihoods opportunities for low income people especially in rural areas. Migration, therefore, migration is a foregone conclusion in search of employment and better wage for all sections of society. Important to note is that most of the migrants workers are un-skilled and working in informal sector.

In a developing country like India, a large number of people are unemployed or pushed to a low income jobs, often engaged with temporary or seasonal employment. Largely they are under-employed and do not have adequate opportunities for a gainful employment (Gupta.S.P, 2006, p.63). Indeed, this leads to the root cause of poverty and unemployment among the low income population. There is emerging need to develop alternative livelihoods for low income groups by providing skill development and vocational training to tackle unemployment and underemployment. Majumdar.S (2008) argues that knowledge and skills are the driving forces of economic and social development of any state. Low income people and youth need skills to find a job and enhance their income in India. Ahmed (2007) argues that, development of skilled workers is likely to enhance the efficiency and flexibility of the labour market and reduce skills bottlenecks in India. Skilled workers have opportunities that they easily absorbed in to the economy and their job mobility is improved (p.297). Skill development is gaining tremendous importance in India in recent past that contributes meaningfully to enhance livelihoods of low income people. This paper aims to analyse how skill development programmes are creating livelihoods opportunities for low income people and youth in India. It also describes the practical challenge and possible measures to overcome these challenges to create better livelihoods opportunities.

India is celebrating 8% to 9% economic growth per annum and technological advancements that has created new job market and enhanced employment opportunities in recent past. In this scenario, a large share of the workforce would shift from the primary sector to the secondary and tertiary sectors(FICCI ICRA, 2010). Further, it requires skilled and educated workforce to enhance efficiency and improve the quality. In India, skills development programmes are playing role to provide gainful employment and enhancing employability and creating livelihoods opportunities for low income people in India. The Government of India in recent years has laid a lot of emphasis on strengthening skill

training to cater the emerging need of the market by focusing on employability skills.

There is a rapid growth in the Indian economy that demands skilled workforce in both, formal and informal sector. About 12 million persons expected to join every year, and an existing skill development capacity of about 3.4 million (FICCI, ICRA, 2010). In India about 15 million youth need primary vocational training every year and the existing capacity of private & public institution is to trained only 3 million (Gram Tarang Employability Training service, 20120. In order to develop skilled workforce, government has initiated programmes by setting up vocational training and education system which are largely not serving the needs of growing economy. The Industrial Training Institutes (ITIs) plays major role to impart skills in India however, they offering traditional courses without assessing the labour market requirements that results imbalance of supply-demand ratio of labour force (Gupta. S.P 2006 pp. 99-103). There is lack of participation of employers in the ITIs/ Training Centres. In addition, there is gap between skills demanded by job market and supplied by the training providers. In India, there is lack of space for vocational training in the formal education system with a view to enhance employability among youth.

There are many programmes undertaken by the state and non-state actors in India such as the National Skill Development Corporation is an organisation promoting skill development of low income groups in India. According to the NSDC, during the year of 2010-11, over 20,000 people have been trained. Currently, there are 556 NSDC-funded centres operating in 153 districts in India. Many non-governmental organisations (NGOs) have implemented programmes to build the skills of low income people, enhance their employability and create new sources of livelihoods. Significantly, these NGOs have implemented programmes in various parts of the country to cater the needs of low income people and migrants workers. These initiatives are largely demand driven, based on market requirements and targeting both formal and informal sector to minimise the skill gaps. These programmes aim to develop skills of low income people and enabling them to participate in expanding workforce in India.

Skill development programmes are playing significant role to provide gainful employment and enhancing livelihoods opportunities for low income people and migrant workers in India. There is significant impact of skills development programmes on low income people and migrant workers as they got new source of livelihoods and enhanced their income. However, a majority of workforce in the does not possess marketable skills which is an impediment in getting decent employment to improve their economic condition. Presently job sector is diverse and it demands a range of skills to match a range of employment opportunities. There is growing concern to understand market demand to minimise the skills gaps. There is need to understand and estimate sector wise demand of workforce and emerging trends to minimise the demand and supply gaps. Therefore, skills development and vocational training programmes needs attention in India and have the potential to be contributes towards poverty alleviation and enhance livelihoods for low income people.

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03.03 Sustainable Regional Development

Strategies to enhance the integration of agriculture within urban culture in British Columbia, Canada

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Keywords: municipally enabled and supported agriculture; bio-regional agri-food systems; food security; food self-reliance

In Canada and the United States less than 2.0% of the population is engaged in production agriculture, a precipitous decline in less than three generations. As agriculture and agriculturists increasingly get relegated to the socio-cultural margins, urbanites are losing substantive, meaningful relationships with this fundamentally critical aspect of our sustenance and daily lives. Food has become little more than a system throughput- it enters in untold quantities and forms, and its waste products (which are many) go out.

In southwest British Columbia, Canada, as elsewhere, there is an emergent local food movement and a growing awareness of the combined effects of peak oil, peak water, climate change, rapid urbanization, continued population growth, and the loss of farms and farmers on the status, configuration and dominance of conventional industrial agriculture. Municipal governments in turn are increasingly at the forefront of contentious and polarizing issues around population growth and economic vitality propelled by urban encroachment onto agriculture lands that threatens food security and food self-reliance.

For the past two and a half years, researchers at Kwantlen Polytechnic University's Institute for Sustainable Horticulture have been developing and refining two linked concepts that demonstrate ways to directly tie agriculture to the economic, social and ecological sustainability of communities in British Columbia, and beyond. With recent funding support from the Yukon Agriculture Association and the Real Estate Foundation of British Columbia, we are building an applied research program that over the next 3-5 years will position ISH as a significant innovator in building sustainable agri-food systems.

The twin concepts: Municipally Enabled Sustainable Agriculture (MESA) and Bio-regional Agri-food Systems will inform how urban and peri-urban agriculture can enhance community and ecological adaptability and resilience, job creation and regional economic productivity, improved human health and nutrition, food security and food self-reliance, greenhouse gas mitigation and climate change adaptation, and the revitalization of family-based farming in communities throughout southwest BC and in the Yukon.

MESA describes an approach in which Municipalities take a lead role to enable or support the full integration of an agri-food system within the planning, design, development and function of human settlements. Beyond the municipal impacts, the Bio-regional concept advances food systems based on regional resource capabilities that respect ecological limitations, focus on and nurture place and

community, and complement the global system by optimizing land and resource utilization through maximizing regional food self-reliance.

It is the objective of this paper to describe the strategies and initiatives we are undertaking to advance sustainable bio-regional agri-food systems.

Method

We are working closely with a number of progressive municipalities to explore how MESA, as part of a bio-regional agri-food system strategy, can mitigate against current threats to the sustainability of our agriculture by describing practical ways to educate the next generation of urban farmers, enhance food security and agri-food production capacity, and position regional food systems as a significant economic engine. The research will be applied in communities in Southwestern British Columbia and the Yukon.

Result

The ideas and case studies presented are intended to stimulate creative thinking on urban growth management, food self-reliance and the sustainability of agriculture.

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Green Hubs

Flow of ecofriendly action in community organisations and businesses to individual members' pro-environmental behaviours across home, work and community

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Keywords: pro-environmental behaviour; sustainability development in regional communities; community engagement; community; work home interface

Several explanations for the engagement of people in more ecological behaviour have been shown as not influencing individual pro-environmental behaviour, unless there is some personal benefit which is obvious and immediate. In fact, Kollmuss and Agyeman and others have established that the drivers that form pro-environmental behaviours of individuals are so intricate, transient and complex that one single framework cannot capture them.

Not all pro-environmental behaviours and practices used at work or in a community organisation are transferable to the home, work and community spheres of members. However, it is reasonable to assume that leading business and community organisations that visibly embrace pro-environmental practices will have an impact on actual practices and behaviours of their members.

This study tapped into the evaluation and data collection of a successful climate change community engagement program. The Green Hub program is led by the Conservation Council of South Australia (CCSA) since 2009, with support of the Department of the Premier and Cabinet and other government departments.

In the area of community engagement on managing resources sustainably CCSA research identified a major gap in regional climate change engagement in South Australia (and nationally). The identified gap lies with small commercial or community businesses and their premises; especially as they are not under the control of local, state-, or federal governments or part of corporate organisations.

The CCSA implemented a Green Hub program to firstly reduce the environmental impacts of clubs and workplaces in targeted communities by offering an action package to help reduce the carbon footprint. This package included an environmental audit, an educational community program on sustainable living, support to identify government grants to secure funding for the implementation of sustainability audit recommendations and support with writing grant applications to secure funding. Another aim of the Green Hub program was to secondly reach out to club members and business employees to help them reduce their individual greenhouse emissions and eco-footprint.

Environmental audits estimated utility usage, greenhouse abatement opportunities and summarised projected outcomes of implemented suggested recommendations.

The complete data contains two different data sets. In 2009, preliminary qualitative interviews were conducted with one representative each of the initial three pilot hubs; the current program

encompasses meanwhile 11 successful green hubs. Those qualitative interviews were conducted in 2009 using semi-structured questions over the phone. Additionally one focus group of club members was recruited to interview and elicit member's experiences, attitudes and views of the Green Hub program and its impact from an individual perspective. A semi-structured focus group schedule was used there.

The initial set of questions inquired about participants' perceptions of national and local environmental priorities and actions. This context provided some indication how the green hub program is responding to the established environmental concerns of partner organisations and communities. These enquiries were followed by questions about experiences and attitudes in relation to the Green Hub program.

Verbatim transcripts and interview notes revealed that three interconnecting themes emerged with regard to perceptions of general environmental priorities: water/drought issues, waste recycling problems, and natural resource depletion and degradation.
During 2010 and 2011 ten successful organisations in the green hub program participated at the end of their program in an evaluation process. A questionnaire was distributed to their respective executive members.
The evaluation of both data sets supports the hypothesis that community organisations and businesses, that embraced the Green Hub program and therefore became visibly leaders in pro-environmental action positively influenced their members' pro-environmental behaviour patterns across life spheres. The flow on effect of sustainability actions taken at the community clubs and businesses affected member's knowledge of environmental solutions, improved community capacity and cooperation, caused new pro-environmental behaviour at work, home and in other community spheres. Actions taken at the green Hubs- to name a view - were the installation of composting toilets, insulation of buildings, uptake of dual flush toilets, hosting of a community garden, instalment of solar systems, and the uptake of Bokashi composting systems.

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Innovations for sustainable biomass utilisation in the Upper Rhine Region (URR)

A comprehensive multi-disciplinary approach to assess regional sustainability

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Keywords: biomass; supply chain; sustainability; multi-disciplinary approach

Biomass is a renewable resource that can be used as energy carrier and to produce a range of chemicals and materials, whose future demand is estimated to grow substantially in the next ten years. However, the significant increase in biomass utilisation will present substantial sustainability challenges, in particular as it may rely on energy crops. The production of these crops raises questions as for land consumption, land use change and competition with food crops. Accordingly, biomass utilisation implies considerable environmental and social impacts, leading to distrust and rejection of biomass projects by various interests groups. Avoiding or mitigating these impacts is therefore crucial to a successful future of the biomass industry. A comprehensive approach is necessary, taking into account the whole supply chain, diverging use options, regulatory and industry framework conditions, but also the specific local environmental and social situation, to find the most sustainable way of biomass utilisation. While the bioenergy potential of the Upper Rhine Region (URR) is already being deployed in several isolated projects, there is no consistent strategy aiming at a sustainable biomass exploitation for the entire region.

The superior vision of the project is to establish the trinational URR as one of the most innovative European regions for the sustainable utilisation of biomass. The concrete project objective is to stimulate biomass utilisation as a renewable energy and/or raw material source by preparing a "Roadmap Sustainable Biomass Utilization in the URR" that will serve as an action plan and a strategic guideline to implement biomass projects in a sustainable way. Therefore, the project aims at considering all relevant aspects of the biomass supply chain, taking into account different options for its evolution in scenarios, analysing potential implications and impacts under sustainability criteria, and initiating the local discourse about the pros and cons of biomass use, as public awareness and involvement are seen as a major criterion to achieve public acceptance. Besides the involvement of local stakeholders, it is also the explicit intention of the project to unify local scientific expertise in this regional project approach. The aim is to constitute a trinational interdisciplinary network of scientists from throughout the URR as a local "task force" to address environmental problems in their home region, together with politics, industry, and the local public. To establish this network in the long run, it shall be institutionalised in form of the "Upper Rhine Environmental Research Institute" (URERI).

The projects for the first time bundles the excellence of 11 internationally renowned universities and other research institutions of all three countries of the URR (Germany, France and Switzerland) in a regional scientific alliance to address the cutting-edge research topic of sustainable biomass utilisation within and for their home region in a combined effort. This allows to assess the specific transnational implications of biomass utilisation and to develop a common biomass strategy for the region. By the

combination of natural, engineering, economic, social, and entrepreneurial sciences, the whole process chain will be assessed in an integrated approach. The project will also span the bow from scientific research to an entrepreneurial strategy for project implementation, giving an important stimulus to environmental policy and innovation. As with this cooperation regional scientists will address specific regional problems not only as scientific experts but also as inhabitants and stakeholders of their region, this will enable trustfulness and a common understanding in the discourse with local stakeholders. Following this first project on biomass utilisation, the creation of the "Upper Rhine Environmental Research Institute" (URERI) will institutionalise this network of research institutions and stakeholders for a local sustainable development in the long term.

So far research in the field of biomass is limited mostly to distinct local projects, a specific resource (mostly wood), or a specific aspect (e.g. land use competition), while there are some attempts to promote biomass projects in selected regions (e.g. the European BEn-project). This proposal in a unique way not only pools the collective local scientific expertise from all bordering countries of the trinational URR for this regional project, but also embraces local agriculture, politics, utilities and the public to generate regional sustainable solutions

The involvement of politics increases the understanding of different local framework conditions and promotes the international cooperation between local authorities of the three countries. The open stakeholder discourse will tackle the associated societal aspects of biomass utilisation, providing competence building and decision support, to avoid the public rejection of biomass projects. The development of optimized solutions together with recommendations for implementation will stimulate local entrepreneurship, increasing value generation and fostering rural development in the region, as that is mainly through farmers, municipalities and SMEs that bioenergy projects give birth. In line with the objectives of the Trinational Metropol Region Oberrhein (TMO), by paving the way to establish the URR as one of the most innovative European regions for the sustainable utilisation of biomass the project will foster its economic, societal and territorial cohesion.

The project will initialise a widespread trinational collaboration in environmental research in the Upper Rhine valley, embracing all major research institutions within the region. They also represent a highly interdisciplinary team integrating economic, social, engineering and natural sciences, that will be needed to assess transnational aspects of e.g. different legal and economic framework conditions that are crucial for developing cross-border biomass concepts. Thus the consortium allows in a unique way to share sound research experiences, e.g.: experimental work on biomass (Laboratoire de Gestion des risques et environnement, Université de Strasbourg), techno-economic assessment and optimization (Karlsruhe Institute of Technology, French-German Institute for environmental research, institute for technology assessment and system analysis), sustainability assessment and biomass potential analysis, Integrative Concept of Sustainable Development, using geographical information systems for the assessment of regional potentials of renewable energy (university of Freiburg, university of Koblenz/Landau, university of Basel), analysis of environmental, social and economic impacts (Fraunhofer ISI, university of Basel) and entrepreneurship analysis (Ecole nationale du Genie de l'eau et de l'Environement de Strasbourg).

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Ecological, Organisational and Institutional Challenges of Organic Cocoa Cultivation in Bolivia

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Keywords: cocoa; agroforestry; Bolivia; organic certification; cooperatives; resilience

The problem

Organic cocoa is a growing market due to a globally rising demand. It is believed to enhance a more sustainable production, combined with the premium prices increasing revenues at the national level. In the sub humid mountainous secondary rainforests of the region Alto Beni on the eastern foothills of the Andes, more than 1500 families cultivate organic cocoa. They are organized in a cooperative that facilitates access to organic certification and fair trade schemes facing the following challenges: Cocoa producers mention decreasing yields, heat waves, droughts and inundations as climate change induced impacts putting their farming based livelihoods at risk. Increasing temperatures result in a reduction of working time; crops are frequently severely affected by droughts. As a consequence, farm resilience is significantly reduced.

Solutions

A promising strategy to face these challenges is the shift from cocoa monocultures to diversified agroforestry systems. Although this is a viable option for local families of the Alto Beni from a technical point of view, how to implement it in such a way that feasible options for transition from monoculture to agroforestry-based systems are possible is not yet understood. The aim of this research study was therefore to evaluate the role of organic certification and cooperatives for the installation and support of agroforestry systems to enhance farm resilience.This was done by using the concept of farm resilience described by Milestad (2003) which includes the variables buffer capacity, self organisation and adaptive capacity. As key indicators, yields, self sufficiency, biodiversity parameters and the diversity of crops and income sources were identified.

Methods

The methods used were 53 semi-structured interviews with cocoa-farmers, biophysical samplings in 15 plots of cocoa-farmers and participant observation in 12 families. The indicators were then compared in farms with cocoa monocultures and farms with cocoa agroforestry systems.

Results

The shift from monocultures to agroforestry systems was clearly enhanced by local institutions, e. g. the

local umbrella organisation of local organic cocoa cooperatives, with information material, courses, tree seedlings and technical assistance in the cocoa plot. Organic certification alone did not enhance agroforestry because the standards of the export destinations do not require cultivation in agroforestry making thus no difference regarding monocultures which are certified as well. But the ideas and principles of organic farming had been adapted to the local context and further developed by many members of the cooperatives who often went further than the officially established standards. After comparing the identified farm resilience key parameters, it results that diversified agroforestry systems for cocoa production are a viable alternative to the common monocultures in the research area. The cultivation in agroforestry systems facilitated families to benefit from environmental services in order to better adapt to climate change and provided manifold products with the potential for a higher self sufficiency, diversified diets and more income sources.

However, most families claimed to still suffer from a lack of access to new knowledge and training courses on agricultural practices and agroforestry and, at the same time, showed a high interest in personal and organizational capacity building. Constraints were the available time, distances and transport problems. We conclude that it is therefore essential that the central cooperative enlarges and supports farmers' field schools in the respective plots of the sub-cooperatives. It was shown that working as a member of a cooperative enhances a socio cultural process of family integration that allows to further innovating models of organic agriculture that is able to even go beyond officially established certification standards.

Knowledge Management resulted as a key factor for sustainable cocoa cultivation and resilience building to be able to face the environmental challenges. The umbrella organization of cooperatives could serve more systematically as a knowledge resource centre. For this purpose cocoa producers should be encouraged and enhanced to interact in more transdisciplinary ways with researchers and agricultural extensionists of local organizations as teachers and trainees in the same time. Rather than understanding knowledge management as linear process from research to cooperative to farmers, it should be reconceptualised as context in which farmers, coop administrators, researchers and extensionists co-produce knowledge in a dynamically evolving social learning process.

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Local community versus globalisation tendencies

Case study of Czech villages in Romanian Banat region

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Keywords: Banat; traditional society; modernisation

The main research question of the paper is the relationship between the local community and globalization tendencies and the ways of transformation or maintenance of local traditions in globalized environment. The research area is a specific locality of two Czech villages (Svatá Helena - Sfanta Elena and Gernik - Garnik) in Romanian Banat region (south-western Romania). These villages are located in hilly landscape (600 - 800 m above sea level) in karst relief near the Danube River. Villages were established in 1820s when the landscape was colonized by inhabitants from Bohemia. By that time, the area was Military boarder of The Habsburg monarchy. Colonists went to the almost non-settled area with huge beech forests. They had to cut down forests and changed them to fields, meadows and pastures and they founded seven Czech villages. Six of them rest still settled almost only by Czechs who get married only in their community. The local communities had constituted themselves till the half of the 19th century and they have consequently evolved in a relative isolation from their Romanian surrounding, that was given by cultural and physical (big distances) barrier. At the same time the inhabitants of Czech villages have always kept up contacts with their home country, although more or less irregular. These contacts were kept due to missionaries and education workers at the end of the 19th century and in the interwar period (1918 - 1938) and due to the correspondence between local inhabitants and family members who went to Czechoslovakia just after the World War II as well. Agriculture was the most important activity of inhabitants despite the fact that mining factory was opened in the nearest town Moldova Noua and many men worked there. Women, children and men after the regular work in mines worked on their fields. Agriculture was and in many features still is traditional, self-supplying, hard-working and poor. It is on the level where European agriculture was one hundred years before, without hard machinery and mostly with manual work. The life-style has always been environmentally friendly because without all modern technologies.
Nevertheless, the modernization exploded dramatically in these villages in the Banat region after the year 1989, when the communist policies of N. Ceausescu collapsed along with Romania's isolation in general. Life and society in these villages became deeply changed. Within the context of political changes and travel possibilities people from the Czech Republic have rediscovered their countrymen in Romania and a rather busy tourism has developed there. The tourism is focused on visits of villages in Banat region (Svatá Helena and Gernik are the most visited villages) by Czech tourists who live in families and sometimes help in house and with field work (agrotourism). Tourists bring actual information about the Czech Republic and living conditions there. Moreover, the Czech Ministry of Foreign Affairs support development projects of NGOs (e.g. People in need) for making better living conditions in villages (e.g. Czech teachers, renovation of schools, better roads). Simultaneously, another wave of strong migration from Banat villages to the Czech Republic has started. People find living conditions in the Czech Republic easier and leave hard work on fields, relative poverty and unemployment (mines were closed in the half of 1990s). First, mostly young people reemigrated to the

Czechoslovakia in 1991 and 1992 and depopulation of these villages has continued. It brings huge land cover changes because people who remain could not use all arable land. Thus the arable land (especially of the worse quality and further from the village) is abandoned and left for the natural process. The landscape character is changing slowly but dramatically. The entrance into EU 2007 meant an additional opening of Romania to the world. Together with it, by that time, the unknown enterprise activities, started there. One of the distinct manifestations of globalization tendencies is the build-up of wind power plants, which is currently in progress in the cadastral territory of Svatá Helena. In Gernik the preparations proceed these days. The build-up is not only a huge intervention in the landscape (with its impacts both on landscape character and nature), but in lives of local people as well. Wind power plants represent clear source of energy, but on the other hand, the company acts from a strong position and takes advantage of simplicity of local people.

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04.01 Corporate Social Responsibility / Corporate Citizenship

Ethical leadership - a driver for corporate social responsibility?

A qualitative investigation of the experiences of executive ethical leaders

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Keywords: business ethics; corporate social responsibility; ethical behaviour; ethical leadership; executive leadership; stakeholder management

After a decade of ethical, financial and ecological disasters, such as Enron, the financial crisis and the Gulf of Mexico oil spill, questions about how to prevent ethical failures in companies and how to enhance their corporate social responsibility (CSR) activities remain both urgent and important. Executive leaders have been identified as a key driver of CSR (Swanson, 1999, 2008). Likewise, the search for the causes of business frauds and ethical failures of companies has increasingly focused on leaders and managers. For instance, Webley and Werner (2008) criticised top management's lack of commitment to ethics, and several studies have shown that managers substantially influence the ethical or unethical behaviour of their subordinates (Brown and Treviño, 2006; Brown et al., 2005; Mayer et al., 2009; Walumbwa et al., 2007). Additionally, leadership scholars have begun to pay attention to ethical aspects, and ethical leadership (Brown et al., 2005) has become a thriving research field.

However, the role of leaders has been ignored in most of the CSR research (Waldman and Siegel, 2008), with a few exceptions (Angus-Leppan et al., 2009; Maak and Pless, 2006; Swanson, 2008). We here propose executive ethical leadership as a valuable candidate to fill this gap, even though, to date, ethical leadership has focused mainly on the relationship between leaders and employees and has neglected other stakeholders. Brown and colleagues (2005, p. 120) defined ethical leadership as "(...) the demonstration of normatively appropriate conduct through personal action and interpersonal relationships, and the promotion of such conduct to followers through two-way communication and decision-making." Ethical leadership has received a great deal of attention in recent years. However, after reviewing previous ethical leadership research, we argue that several fundamental questions remain unclear and need further investigation: (1) Which stakeholders, apart from employees, are important to the ethical leader? (2) What specific behaviours does an ethical leader show towards these stakeholders? (3) What are further antecedents and consequences of ethical leadership? We addressed these questions by qualitatively analysing interviews with 17 mostly Swiss executive ethical leaders. The results indicate that existing conceptualisations and measurements of ethical leadership (Brown et al., 2005; Kalshoven et al., 2011; Tanner et al., 2010) should be specified with and complemented by a multiple-stakeholder perspective instead of primarily focusing on the ethical leader's behaviour towards employees. As a consequence, these insights into ethical leadership may foster our understanding of how executive leaders can be drivers for CSR activities. Furthermore, this study may serve as a source of inspiration for future quantitative research by identifying specific executive ethical leaders' behaviours towards various stakeholders, such as employees, customers, suppliers, owners of companies, and society. We also identified several antecedents of executive

ethical leadership, such as type of ownership and business strategy, and consequences, for example long-term financial success, employee ethical behaviour, satisfaction of stakeholders, and positive company image. Additionally, our results shed more light on the process of ethical guidance of employees and conflict management. Managerial implications and avenues for further research are discussed.

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Responsible Organisations need Responsible Leaders: Discuss and Define?

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Keywords: CSR; responsible leadership; sustainability-literate leadership

Sustainable Business development is a hugely diverse concept both in the academic literature and on the ground - in business practice. However much of the research attention to date has focused on the performance, growth and practices of the businesses themselves (see Porter, 2011; Linnanen, 2002) and perhaps less has sought to understand, in this wide-ranging drama, the attributes, characteristics and qualities required in the leaders of such businesses. Management literature has for many years struggled with the concept of 'leadership' and the divide between that and the more recognisable one of 'management.' Defining what we mean by leadership is still controversial and we are now moving from recognition of the notion of leadership to one of followership; Grint, for example, (2000) tells us that 'a leader imagines a better future and persuades people to follow.' We are adding further to the controversy and intensifying the debate by now referring to notions such as sustainability-literate leadership (Parkin, 2010) and Responsible Leadership.

To be 'responsible' is a generic concept that we all claim to understand although interpretation of the appropriate behaviour in specific circumstances is open to debate. It is however the moral imperatives captured in this terminology to which we should pay attention. To be responsible is to care; to understand the issues and further, to seek to understand the issues. It is perhaps to take a broader view of the situation and ultimately and most importantly to take action regarding the situation presenting itself. That broader notion must also include a look to the future; an understanding of the timescales and the unfolding of events therein, so that action is not simply retrospective but prospective anticipating developments and being unafraid to change the course of events where necessary. A Responsible Organisation striving to be a sustainable business must then seek not only leaders, an evasive concept before, but 'Responsible Leaders.' Indeed, if we wish to foster the behaviours that generate more sustainable businesses and their appropriate modus operandi, then an acknowledgement of the Responsible Leader is surely fundamental to that impetus.

Responsible Leadership is an increasing element in the wider zeitgeists of 'Corporate Social Responsibility' (CSR) and 'Sustainable Business.' Some would argue that it is at the heart of the effectiveness of both of these mechanisms. This paper examines the notion of Responsible Leadership, examines the kind of qualities and skills such leaders might require, and looks at the way in which we might encourage such leaders to come forward and to change the way in which our businesses are run. The research, through both secondary data and empirical study, seeks to explore what a definition of Responsible Leadership might be and whether it can, as yet, be clearly categorised and understood. The paper goes on to explore a number of different perspectives in order to understand the context for Responsible Leadership in practice. Thus it critically examines empirical thought, reviews approaches by businesses and refers to Responsible Leadership in Academia. Finally the paper reflects upon the implications of a developing genre of Responsible Leadership, identifies three strands of skills and attributes in which a Responsible Leader might excel and determines that recognition of this role has a

significant contribution to make to Corporate Social Responsibility and Sustainable Management mandates.

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Functional involvement in corporate sustainability management

Contribution of corporate functions to the sustainable development of companies

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Keywords: corporate social responsibility; corporate function; corporate sustainability; sustainability management tools

The important role of corporations for achieving sustainable development has been emphasized by various scholars (e.g. Shrivastava 1995; Marcus et al. 2010; York & Venkataramen 2010). In corporate practice, however, sustainability is often considered to be mainly a communication issue, which is dealt with in sustainability reports, stakeholder dialogues, etc. (Black & Härtel 2004; Clark 2000). Communication plays, without doubt, an important role in corporate social responsibility. Nevertheless, communication alone does not make a real contribution to sustainable development. To make substantial contributions towards greater sustainability rather requires that various actors and corporate functions are involved in the implementation throughout the organization (Dunphy et al. 2007; Epstein 2008, 90ff.; Martin et al. 2007; Shrivastava & Hart 1995). One important reason for such a cross-functional approach is that all functional units related to the value chain have to be involved in sustainability management for it to become effective (Carter & Rogers 2008; Singh et al. 2008) and to impede sustainability problems from being partially and superficially 'solved' or from being shifted to and from functional units. To develop and promote more sustainable products, for example, this includes the involvement of research and development (R&D), marketing and production as well as supply chain related departments such as purchasing and logistics (Carter & Dresner 2001; Darnall et al. 2008; Seuring & Müller 2008). Furthermore, supporting functions such as strategic planning, public relations (PR), human resources (HR), accounting, management control and finance should also be involved (Porter 1985; Schaltegger & Burritt 2005; Shrivastava & Hart 1995) to ensure strategic embedding, motivation of personnel, and adequate information. In sum, there is no corporate function which is not expected to be involved in the implementation of corporate social responsibility or which has not been assigned a sustainability management role in literature. All corporate functions are able (and challenged) to contribute to the sustainable development of the company and to ensure its contribution to the sustainable development of the society.

In addition to the challenges single corporate functions encounter, many crucial sustainability management tasks, like the integration of sustainability into the corporation's core business model or the application of tools such as a sustainability balanced scorecard or social-eco efficiency analysis (e.g. Schaltegger et al. 2007), require the collaboration of various functional units. Management research has so far neglected to empirically analyze to what extent different corporate functions are involved in the practical company-internal implementation of corporate social responsibility. This is why we investigate to what extent and how different corporate functions contribute to the implementation of sustainability management and what influences a functional unit's level of involvement.

The paper examines involvement of corporate functions in sustainability management with three measures: affectedness, promotion, and application of tools.

Firstly, involvement requires affectedness. Various authors suggest that companies start to be

concerned with sustainability if they are affected by environmental and social issues, for instance, in case that they are pushed by stakeholders (DiMaggio & Powell 1983; Dunphy et al. 2007; Freeman 1984). Responding to stakeholder demands shall often serve to secure legitimacy (Bansal & Roth 2000; DiMaggio & Powell 1983; Nijhof et al. 2008) or to meet market demand (Hahn & Scheermesser 2006; Meffert & Kirchgeorg 1998; Nijhof et al. 2008). Thus, a first step of involvement exists if a corporate function is affected by sustainability issues. This step can be described as 'passive' involvement, since it does not require an active contribution of the functional unit and is often, though not exclusively, considered to be a reaction to external pressure or demand (Delmas & Toffel 2008).

Secondly, a department or shared service unit may engage in the promotion of sustainability measures in the company. Promoting corporate sustainability, as a difference to simply being affected, indicates a more proactive attitude of a functional unit, which is expressed in the support of activities within the company or in realizing measures itself. Reasons for fostering the implementation of sustainability management may be very different, ranging from an intrinsic interest in sustainability improvements to the insight that interdependencies exist between the departments which make their collaboration necessary to reach certain goals (e.g. Schaltegger 2011).

Thirdly and most tangible, a corporate function can materialize its involvement with the application of sustainability management tools. In addition to the above mentioned aspects, a corporate function's involvement in sustainability management is particularly realized by the systematic application of sustainability management tools. Several publications document that various tools for each functional unit exist (European Communities 2004; Hahn & Scheermesser 2006; Herzig et al. 2006; Schaltegger et al. 2007).

In this paper these three kinds of involvement are investigated empirically. They are supposed to be interrelated in a way that affectedness and promotion foster the application of tools. This relation is expressed in a model and derived hypotheses are tested on the basis of a survey of large German companies in 2010.

The paper finds highly significant empirical links between promotion and the application of sustainability management tools as well as, to an even higher degree, between affectedness and the application of tools. Moreover, the survey shows large differences between corporate functions with regard to their affectedness, promotion, and the application of tools. The involvement is highest for PR/communications and lowest for finance, accounting and management control.

Taken together, these results suggest that the application of sustainability management tools can be fostered by increasing the affectedness of a corporate function and the promotion of implementing sustainability measures. In practice, both a functional unit's perceived affectedness and its promotion of corporate sustainability can be influenced (e.g. by incentive systems, information campaigns) by corporate sustainability management aiming at integrating more functions in corporate sustainability management.

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04.04 Corporate Social Responsibility / Corporate Citizenship

Sustainability and responsibility in the German water economy

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Keywords: water economy; sustainability management; CSR; eco management tools; ISO 2600

Water-supply and distribution companies are characterized through a high need of energy. The challenges of a sustainable development and the climate change as well as the necessity to reduce climate relevant emissions and develop adaptation strategies are aimed at a drastic reduction of energy costs and the development of intelligent sustainability-oriented infrastructure and management systems (Palme 2009). In the energy sector, the climate change will influence the transportation ways and risks, change the availability of resources and raw material supply as well as restructure the value chains, cooperation and specific division of labor. In order to be able to meet the requirements of a sustainable development and look after their social responsibility WSDC should develop strategic options because of the coupling from energy demand and a high quality of water treatment and wastewater disposal.
The special challenge can be seen in the high path dependency of the infrastructure of sanitary environmental engineering. The system is built on mass throughput and consumption growth and is therefore only partly adaptable to changed conditions (Mayer-Spohn 2004). Against this background, the ongoing changing situations and conditions cause high instability at the actors. The central task has to be seen in the necessary conformity to the changed facts, like a strategy for resource conservation and an efficient resource use. In the last two decades, considerable innovations could be developed in the fields of alternative water-supply technologies in Germany. However, they were mainly realized in some, small-scale pilot projects.
Recently, utility services in the water sector have faced an increasing number of transformation challenges, e.g. deregulation, liberalization, and privatization (esp. Articles 17 and 18 of the German Agenda 21). In addition, the technologies of drinking water supply and their management systems are potentially vulnerable to climate change. The value-added processes of water supply companies (e.g. water collection, treatment, storage and distribution) require a high energy impact. Excessive use of non-renewable resources, low level of energy efficiency and high levels of carbon dioxide emissions are some of the main challenges that need to be addressed. Thus, sustainability performance of water companies requires a greater use of renewables in the production process along the value chain of drinking water.
For the strategic water management high requirements at an eco-efficient energy procurement results from that. High levels of energy and resource consumption in the value chain of drinking water are the leading indicators for procurement of renewable energy regarding sustainability and sustainable supply management. Energy Supply Enterprises (ESE) have a high level of entrepreneurial responsibility in the context of sustainability. The responsibility by the ESE's can be seen beside ecological indicators (percentage part of renewables in the electricity mix, energy efficiency) and social requirements (price structure, compliance with social standards) in pursuing sustainability-oriented process innovations to achieve a comprehensive contribution simultaneously within the general climate debate - through

reduction of the negative environmental effects. Thus, the challenge for a water utility company deals with two goals:

o Reducing external costs through eco-efficient energy procurement, an increase of renewable energy supply, and more eco-efficiency in production processes.

o Integrating sustainable energy procurement and sustainability requirements into strategic management in general.

The water supply enterprises (WSE) face these challenges differently. Municipal WSE often do not change proactively compared to private WSE. In general, there is a need for governmental regulation in order to secure sustainable transformation, e.g. by target-setting regarding renewable energy supply in the water sector. Policy could help to enhance a sustainable energy procurement and transformation within the water sector by transferring the renewables' contribution to the water sector in Germany. In this context, the aim of this paper is to analyse the challenges and good practice solutions for sustainable economies as part of the national sustainable strategy by water supply companies in the German Water Sector. This study investigates to what extent water supply companies implement sustainability management tools and norms (e.g. ISO 14001, ISO 9001, Balanced Scorecard etc.) as well as confirm ISO 26000 (Munoz-Torres et al. 2009). In this context, the central research question is how water companies implement sustainability and CSR requirements in their management.

However, by analyzing 65 German WSE and their energy strategies, environmental management and CSR aspects we found that the triggers for a sustainable energy use and a sustainable management (e.g. avoiding and minimizing risks in purchasing energy, ensure environmental standards by energy suppliers) were just marginally determined. Moreover, our results make obvious that there are big differences between municipal and private WSE facing sustainability requirements as well as regarding the management of local or centralized water supply.

For transforming water supply systems towards more sustainability and climate change protection the combination and integration of energy and water supply in order to foster a sustainable development could be one solution. Our results highlight isolated networks and strategic partnerships in regional networks as the first good practice of a market opening up to regional partners. In particular, there are central differences in the way of co-operating with energy suppliers and integrating the market development requirements, e.g. adopting and investing in new infrastructures. In total there are new management tools and policy options necessary. Moreover, there is a lack in CSR communication and making CSR credible to public.

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Systematic stakeholder engagement a key to success

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Keywords: stakeholder engagement; needs assessment; issue management; creating shared value; partnerships; community advisory panels

In recent years, companies have come to recognize the value of identifying, meeting with and listening to their stakeholders. Whether to gain trust in local communities, to mitigate the negative effects of potentially 'hot issues' or even to further innovation, companies have increasingly solicited external views and ideas from amongst their stakeholders.
Today several international standards such as the UN Global Compact, ISO 26000, the Global Reporting Initiative and many more have identified stakeholder engagement as a key success factor for corporate social responsibility.
While the value of stakeholder engagement is fast becoming apparent, many companies have also learned that it is not necessarily easy. For many organizations finding the right approach to stakeholder engagement and tapping the wider benefits it offers to their business is still uncharted territory.
Most companies are used to communicate with market stakeholders such as employees, customers, suppliers, shareholders or business partners on a regular basis providing information about the organization and its products. Collective bargaining with workers through trade unions as well as reactive stakeholder engagement in case of a crisis when an organization has to engage to solve an issue are other forms of stakeholder engagement companies are getting used to.
Most of these engagement activities however are one-off or reactive two-way engagement. To assess and address changes in the global societal environment and to create shared value systematic stakeholder engagement with non-market stakeholders such as community members, neighbours or NGOs should be a standard element of daily business.
Significant strategic advantages can be won through the implementation of pro-active stakeholder engagement processes such as needs assessments, on-going community advisory panels, and external grievance mechanisms, integration of stakeholders in advisory boards or strategic partnerships.
These methods of engagement provide a forum for identifying controversial issues before they turn into conflicts or spotting opportunities for everyone involved and will be further explored with practical examples during the session.

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The Impact of Financial Crisis on Corporate Social Responsibility and its Implications on Reputation Risk Management

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Keywords: financial crisis; corporate responsibility; sustainability; reputation; social risk; stakeholders

This research explores the impact of the financial crisis of 2008 on Corporate Social Responsibility initiatives - CSR -and its implications for reputational risk management. The social risk theory suggests that there is a new kind of risk related to CSR that can affect a company's reputational value. This research is a multiple case study that considers two multinationals operating in the same sector. Qualitative data have been collected in many ways such as document analysis, semi-structured interviews and a scaling survey in several locations in three different countries including expert views from reliable sustainability management consultants.
Findings show that the financial crisis of 2008 had a clear impact on CSR initiatives in many companies because of the exceptional pressure that they had to face in order to survive and with massive layoffs and expenditure cuts on community involvement programs being the most obvious outcomes of the crisis. However, not all impacts were seen as negative, many CSR issues were pushed forward and gained more depth after the crisis, such as organizational governance and environmental policies, as well as compensation policies.
The main stakeholders that were affected by the crisis were employees; followed by investors and customers. Similarly, in relation to CSR issues, it was labor practices that were the most severely impacted. What is interesting to observe was that in the studied companies, there was a belief that these issues were not considered as having the highest impact on their companies' reputations.
Companies gave more importance to the issues that related to the stakeholders that they perceive to be the most influential. Therefore, an issue such as environmental policies forms a social risk if green investors decide to withdraw. However, employees are not perceived as influential at the time of the crisis because of the deterioration in labor market conditions and hence the drop in labor practices is not perceived as a threat to reputational value.
Implications for reputation risk management can be identified by risk considerations within the studied companies. Social risks impacting reputation are sometimes reported explicitly in annual reports with direct reference to environmental and human rights issues as well as supply chain management and risks related to compliance and code of business conduct. The reporting is less explicit in other cases with these elements present in the internal documents for risk management but not in the published reports. This implies that many companies have a better understanding of the importance of social risks and their impact on reputation but they do not necessarily report it openly.

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Raiffeisen Volunteers

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Keywords: Raiffeisen volunteers; cooperative

"Raiffeisen Volunteers" stands for the voluntary commitment of the employees of the Raiffeisen Group in the service of society. To support this involvement and to appreciate it, in November 2011, Raiffeisen launched a web-based platform under the same name on which all employees of the entire Raiffeisen Group can present their volunteering activities: volunteer work, club work, patronage etc. The platform also provides the opportunity to win other people for one's own involvement and to join existing / planned projects of other employees. The platform enables interested people to create their profile, present their own engagements, view other profiles and apply to other projects. The functionality of the platform "Raiffeisen Volunteers" is - also taking account of user needs - constantly being upgraded.
The project «Raiffeisen Volunteers - active all over Switzerland", was initiated during the European Year of Volunteering 2011 and aims at encouraging the long-term community involvement within the Raiffeisen Group. The Group-wide commitment becomes part of the sustainability reporting of Raiffeisen.
Voluntary work has always been part of the Raiffeisen Group culture; enriching the Raiffeisen Group with "Raiffeisen Volunteers" marks a new phase in the long tradition of being in the service of society. It is almost natural for employees of the cooperative banks to be involved, locally, in the volunteering projects. The basic idea of cooperative self-help is alive - even outside the bank premises.

Implementation of the ISO 26000 Standard on Social Responsibility with the main focus of SME in Switzerland (Research project)

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Keywords: ISO 26000; Corporate Social Responsibility; implementation; SME

Background

Corporate Social Responsibility (CSR) is a concept which has already been intensively discussed during the last decade, but nevertheless is still in further development. A large number of different concepts and standards for certain topics such as supply chain management, governance or certain processes such as stakeholder relations or reporting came up and had been established with more or less success. Still a broad consensus on content/reference points and range was lacking.
With the publication of ISO 26000 in 2010, for the first time a general guideline and framework for CSR, which was developed during a large international project with multi-stakeholder participation, has been defined although the general reception is still low, it is expected that ISO 26000 will gain an important role as framework and reference for comprehensive and reliable CSR strategy development and implementation. This is also reflected in the new EU CSR policy , where the commission invites large European enterprises to work either with ISO 26000, UN Global Compact or OECD Guidelines for Multinational Enterprises while developing their CSR approach. Being a minor obstacle for large, transnational enterprises, the comprehensiveness of ISO 26000 and the related complexity and its high requirements, represent a considerable barrier for small and medium size enterprises (SME) for an adequate implementation of ISO 26000. Therefore a practical and in its complexity reduced procedure and instrument set is needed, which still contains all issues that are of importance for SMEs. On the other side SME since long time have applied CSR approaches and processes which they do not perceive as such.

Objectives

The project should familiarize SMEs with the CSR concept according to ISO 26000, should identify already exiting activities and engagements and enable SME with the full application/implementation of CSR based on ISO 26000 by the analysis of SME specific issues, the development of adapted instruments and processes, their evaluation and optimization.
Approach and Methodology:
A team of researchers and practical experts lead by the HSLU currently defines in cooperation with the Swiss National Body for Standardization (SNV) and in dialogue with a consultation board of representatives of government, NGO, consulting and certification institutions, a set of analysis and implementation tools specific for issues and needs of SMEs. These will be applied and tested with a diverse group of five Swiss medium-sized enterprises.
The project is organized in the following modules:
o Module 1: Adaptation and development of methods and instruments:

Based on the framework of ISO 26000, existing tools are reviewed, adapted for SMEs and further SME-specific instruments are developed.
o Module 2: implementation processes:
Most adequate processes for implementation of the instruments in SMEs are reviewed. The tools are implemented in five enterprises. The analysis shows already existing aspects of CSR application and areas of further development.
o Module 3: Development of options for optimization:
In cooperation with the participating enterprises and in dialogue with the institutions of consultation board options and programs for improvement are established based on identified gaps and priorities.
o Module 4: Lessons learned:
The results of the projects are evaluated and reviewed. Tools, experiences and case studies are documented and published.

Results and Deliveries

Outcome of the project is a tool set for analysis and implementation of CSR aspects in SMEs in accordance with ISO 26000. This toolset is tested in practical application with SMEs and improved. The documentation of the project shows fields of already existing activities related to CSR and best practice examples generated during the project. These serve as case studies and motivation for other SMEs to implement a systematic CSR process based on ISO 26000.
The research project is substantially funded by the Commission for Technology and Innovation CTI of Swiss government.

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05.01 Institutionalisation and Sustainable Development

Tasks of municipal administration from a multi-stakeholder perspective as a requisite for systemic sustainability assessment

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Keywords: municipal administration; systemic perspective; sustainability tasks; stakeholders; transdisciplinary case study

Introduction

German municipal administrations are facing the challenge of a growing spectrum of performance requirements while financial shortage leads to decreasing freedom of action (Bogumil and Holtkamp 2006). Dynamic changes of tasks and conditions forces municipal administrations to substantially adapt their structures. As a result, several reform efforts have emerged during the last two decades, such as New Public Management and double-entry bookkeeping.

The guiding principle of sustainable development, also implies new tasks for municipal administrations. Agenda 21 (1992) emphasizes the role of communities for implementing sustainable development on a local level. According to Art. 28/2 of the German Constitution, the core task of municipalities is to administer public life by providing public services. In doing so municipalities directly as well as indirectly affect the quality of live and environment on a local level - contributing or inhibiting sustainable development.

Even though many instruments (for an overview see Schaltegger et al. 2009) and some integrative approaches (Fricker 2004 and 2010; Schaltegger et al. 2009; Gehrlein 2004; Pamme 2004; Speier 2003) have been developed to support sustainable development in communities there is still a huge demand for really implementing sustainable development in municipal administration (RNE 2011; Plawitzki 2010; Liepach et al. 2003). We believe that a systemic and more comprehensive view is essential to achieve integrative sustainability management. Based on a systemic view a system e.g. a municipal administration works sustainably when it is able to fulfil its tasks with the given structures under dynamic conditions (Lang et al. 2007). Therefore a thorough understanding of the tasks of municipal administration, especially considering different perspectives, helps to develop structures that support sustainable development. Though the role of communities as an important stakeholder to support sustainable development is emphasized as mentioned above there is a lack of studies addressing the concrete sustainability tasks of municipal administration.

Research questions

Based on that background our research focuses on the following questions:

(i) What are the tasks of municipal administration to support sustainable development from a

multi-stakeholder perspective?
(ii) How do the identified tasks interact with each other?
(iii) Which differences occur in the tasks identified by different stakeholders and in different cities?

Proceeding and methods

In two transdisciplinary case studies we investigate the German cities of Freiburg im Breisgau and Hansestadt Lüneburg. To identify and select the tasks of the municipal administration in general as well as specifically for the two cases, we proceed as follows:
(i) We conduct a literature search with special focus on public administration in Germany and elsewehere.
(ii) We consult experts by means of the "structuring for complex transition" (SCT)-procedure which intends to identify and structure relevant factors of a socio-technical system (Scholz et al. 2009). Applied to our study this procedure shall identify and structure sustainability tasks of municipal administration. As experts we define persons with an expertise in municipal administration.
(iii) We conduct guided telephone interviews with users considering the broad spectrum of municipal services. By users we mean groups of persons using the services of municipal administration while not being employed there. We aim at five interviews per user group and case.
In order to obtain analytical insights into the interactions of the tasks we perform a qualitative system analysis as described by Wiek et al. (2008) including the perspectives of experts and users.

Results

We expect to identify tasks of municipal administrations that differ in general and concerning the specific cases. They are based on knowledge presented in literature and the perspectives of experts and users. Therefore, we also expect differences in the tasks identified by several stakeholder groups. In addition, we gain comparative insights about the two cases Freiburg and Lüneburg.
Furthermore, we generate knowledge about systemic characteristics of the identified tasks such as clusters, interactions between tasks and feedback loops.

Outlook

Based on the results we plan to assess the performance of the municipal administration in the two case studies with regard to sustainable development. In a first step, we use the product catalogue as a concrete example of a structural element of administration. It was implemented in communities as part of the New Public Management reform. For both cases we therefore assign the tasks to the particular products of the catalogue and identify possible gaps. The case cities gain knowledge about possible weaknesses of their product catalogue. In addition this allows us to formulate conclusions that could be helpful for other communities, which also use a product catalogue. In further steps we identify more structural elements of municipal administration and assess their contribution to fulfil the identified tasks to support sustainable development.

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Studying social representations in water management institution building

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Keywords: social representations; water management; small-irrigation schemes; South Africa

The international discourse around sustainable development and the management of natural resources is filled with recommendations regarding the need to build participatory institutions. From local to regional levels, users and stakeholders are called to take a step forward, come together and manage their resources collaboratively. The logic behind these recommendations is one of economic and environmental efficiency; it is one of democratic and shared decision-making. More often than not however, the implementation is driven from the outside. The conditions surrounding the establishment of the 'participatory institutions' are defined at the international or state level; they are defined by politics, development workers or scholars. Users and stakeholders are therefore asked to take part in and take control of institutions defined for them and not by them (Green, 2000). This situation distorts the principle of participation and contributes to the difficulties encountered by institutionalization processes.

This paper focuses on social representations as a means to unravel and explain people's understanding of institutionalization processes and natural resources management. Social representations are a form of common and naïve knowledge that contrasts with scientific knowledge (Jodelet, 1984). They are interpretation systems and guides to people's actions (Moscovici, 1961; Abric, 1994). Social representations consist of elements of information, point of views and beliefs that individuals and social groups mobilize to speak about or develop a particular behaviour towards a given object (Moliner, 1996). Considering social representations allows the rethinking, in an empirical and political way, of numerous concepts central to institution building: collective action, participation, management, development. It allows the re-conceptualisation of these concepts and their study closer to the people, their actions and their state of mind. And as Francis pointed out in 2000: "One important starting point for thinking about possibilities for change has to be an understanding of what people have been doing and why." (Francis, 2000: 45)

This presentation reports on a study conducted in South Africa on small-scale farmers' social representations of water management. South Africa embarked on a reform of its water management system in 1998. Democratization, decentralization and user participation have framed the reform process. However, nearly fifteen years later, local water management institutions are yet to root themselves in the country's small-scale irrigation schemes. This study uses social representations to help understand the difficulties surrounding the establishment of these local water management institutions. It questions small scale farmers' representations of their water resources. It questions their representations of water management and water management institutions and explores the role small-scale farmers perceive having in the national water management system. The study shows depersonalized representations of water management and concludes on the lack of perceived control of institutionalized water management processes by small-scale farmers, two characteristics of small-scale farmers' representations of water management that contribute indeed to the difficulties encountered in South Africa in the establishment of participatory local water management institutions.

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Identifying institutional gaps to transform the institutional landscape of agrobiodiversity

Rice cultivation at stake in India

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Keywords: land use change; net-map method; institutional development; agrobiodiversity

With rice cultivation turning economically unprofitable, the seemingly well-established paddy-faming-system of Wayanad in the Western Ghats of India undergoes severe land use changes and is rendered unsustainable. The inter- and transdisciplinary research group BioDIVA investigates this problem situation from a sociological, economic and ecological perspective to identify drivers and consequences of paddy field conversion into banana plantations or real estate. The central aspect of concern is the institutional dimension of regulations concerning paddy cultivation versus conversion.

Building on in-depth interviews with key actors aided by the net-map methods, I propose an analysis of the institutional environment currently not in a position to steer the collective future of paddy in the district of Wayanad. In addition to the net-mapping exercises with tribal farmers, administrators, NGOs and local policy makers, BioDIVA conducted scenario workshops resulting in visions for an attractive Wayanad 2030 with different stakeholder groups such as indigenous farmers, young farmers associations, women self-help groups, agricultural officers and local politicians. This diverse set of data on the deliberations of various stakeholder groups in addition to the preliminary findings of disciplinary and interdisciplinary nature serves as a background to carry out an analysis of the institutional landscape of paddy at the case of Wayanad in Kerala, South India.

On the one hand the paper will present the institutional landscape gained with the net-map tool, on the other hand it will sketch the way forward to fill the institutional gap by means to foster collective action beyond the particularistic interests of single actor groups, but rather building on a multi-stakeholder approach.

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The Potential of (Shared) Mental Models in Understanding Processes of Institutionalising Sustainable Development in Schools

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Keywords: school development; organisational learning; mental models; education for sustainable development

For schools, the integration of sustainability does not merely consist in the implementation of education for sustainable development in teaching (e.g. Tilbury/Wortmann 2006). Teaching is only one - albeit a central - field of action for a school. There are a number of other possible fields of action, such as school organisation, external relations or infrastructure, in which an individual school has room for manoeuvre (StabeNE*) and thus the chance to shape itself according to the principle of sustainable development (the so called 'whole school approach'). An environment geared to sustainable development also promotes the implementation of education for sustainable development in teaching (UNECE 2011).

Sustainability research suggests that alignment with sustainability is not a one-off and self-contained matter: sustainable development needs to be re-concretised continuously and needs to be implemented in everyday decisions (e.g. Di Giulio 2004). This also applies to schools. This constant examination is ensured through appropriate organisational structures and an appropriate organisational culture (e.g. Siebenhüner/Arnold 2006). In establishing this, organisational learning processes are required. Sustainable schools face dynamic and complex societal challenges and regard their own development as an object of learning. Therefore an individual school must be understood as a learning organisation (e.g. Rolff 2007). The key actors are the individual teachers. They must be able to deal with the idea of sustainability, individually and collectively, to shape school development in the interests of sustainable development.

The organisational learning approach combines the individual and organisational changes required and focuses on continuous learning in organisations (e.g. Argyris/Schön 1996). For organisational learning, the approach of (shared) mental models has a promising explanatory potential (e.g. Edmondson/Moingeon 1998). Initial studies have shown that the mental models approach is able to capture the relationship between the individual and organisational learning processes of teaching staff, as well as the anchorage and the stabilisation of the teaching staff's knowledge (e.g. Fauske/Raybould 2005; Chrispeels et al. 2008). At present, the (shared) mental models approach in relation to school development is still underexplored, especially with regard to sustainability in schools.

This contribution will put up for discussion the potential of the (shared) mental models approach in understanding the processes of institutionalising sustainable development in schools as well as aspects that must be taken into account in understanding these processes. Preliminary deliberations will be presented, for example concerning what elements must be represented by such a (shared) mental models approach and how these can be examined.

*Representative survey of Swiss public schools as part of the SNF project ,,Schule und Nachhaltige

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06.01 Governance of Sustainable Development

Policy Integration through National Sustainable Development Strategies

Conceptual clarifications and empirical evidence from the German case

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Keywords: governance for sustainable development; policy integration; national strategies for sustainable development

Policy integration (PI) has been claimed to be a core principle of governance for sustainable development ever since the idea of sustainable development (SD) entered the political discourse in the late 1980's (Steurer 2010; Lafferty 2004; Lenschow 2002). According to a widespread understanding, PI serves as a strategy for coordinating the policy system's fragmented steering efforts. As such PI is expected to yield coherent policy outcomes that are less prone to create unintended side effects and thus foster a broad transformation towards sustainability (Briassoulis 2005; Meijers/Stead 2005). New governance arrangements such as national sustainable development strategies (NSDS) are widely assumed to exhibit a potential for policy integration and, thus, are perceived as means to trigger the emergence of a more sustainable policy system (cf. Steurer/Martinuzzi 2005; Steurer 2008).

However, despite widespread references to the relevance of PI within the discourse of governance for SD, the relationship between the idea of SD and PI remains conceptually as well as empirically rather vague and loose (Lafferty/Hovden 2003), particularly when it comes to the practical design of governance arrangements such as NSDS.

The conceptual deficiencies are related to the interpretation of PI for the particular normative context of SD and, more specifically, NSDS. Despite a constantly increasing amount of literature on PI (cf. Meijers/Stead 2005; Persson 2007), the discussion still lacks an adequate and analytically elaborated notion of PI for SD that is theoretically rooted in the idea of SD itself (cf. Briassoulis 2005; Lafferty/Hovden 2003). Furthermore, there is only little understanding of how (e.g. with reference to which categories and criteria) policy integration can be analyzed and assessed within a NSDS arrangement.

Although some empirical studies do consider policy integration as an analytical reference point, they do not provide in-depth analyses of the particular structural, procedural, and functional forms as well as the institutional mechanisms of policy integration (cf. the contributions in Steurer/Martinuzzi 2007). Occasionally it is assumed that the mere set up of a NSDS in conjunction with specific institutional arrangements such as inter-ministerial coordination bodies, parliamentary advisory boards etc. is eo ipso accompanied by PI. However, the analytical concepts presently applied are hardly sufficient to grasp in detail the functioning and performance of NSDS arrangements with respect to PI.

Against this backdrop, the aim of this paper is to highlight some of these conceptual and empirical blind

spots by introducing a framework for the analysis and evaluation of PI for SD within the specific context of NSDS. The first part starts from the assumption that the political idea of SD is at its core an integrative idea which implies a specific mode of PI. It is further argued that the common paradigm of environmental policy integration (EPI) often borrowed as an appropriate model for SD does not represent an adequate conceptual basis for the analysis of PI in the context of SD since EPI is theoretically rooted in the idea of ecological modernisation but not in the SD discourse proper. Based on a critical review of the literature pertaining to EPI, a different, more complex notion of PI is proposed that serves as a sound normative foundation for a multidimensional framework designed to evaluate PI within NSDS. It explicitly focuses on structural, functional and procedural conditions of PI within this particular context.

In the second part, this framework is applied to analyze the institutional arrangement of the German NSDS with respect to PI for SD. This comprises an evaluation of the inter-ministerial body, which is primarily responsible for the co-ordination of the NSDS in Germany. Central questions of the empirical study are: How does the inter-ministerial body foster policy integration? What are the achievements of the institutional arrangement regarding PI for SD? What are empirical prospects and barriers towards integrative policy making for SD within the German NSDS? Within this analysis, previously unreleased material of a comprehensive and detailed case study will be presented.

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Sustainable management opportunities in an urban forest of Turkey

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Keywords: contingent valuation; congestion; environmental management

Congestion is an important externality that causes negative welfare effects on individuals using a natural resource. Congestion externality decreases visitor satisfaction obtained from the natural resource while causing many issues for local site management. The current paper resolves congestion issues in a high-density urban forest of Turkey via probit panels using a random utility framework. Contrary to existing literature, we use probit panels to elicit congestion externality only, rather than integrating data representing stated and revealed preferences. In addition, the New Environmental Paradigm (NEP) scale is incorporated into probit panels to understand recreationists' environmental attitudes on congestion pricing. The results offer important insights to policy makers who are confronted with two environmental management options, which are resource-restriction or resource-enlarging policies. Local site management follows a restriction-free policy. Aggregate values indicate that the additional cost of current management practices will increase up to $472,500 USD annually as long as the current policy is followed. The consequences of the probit panels model, based on the NEP scale, point to the resource-enlarging policy as the optimal option.

Prioritisation in climate change adaptation in Gambia using the fuzzy analytical hierarchy process

Adaptation to Climate Change in the Gambia

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Keywords: climate change adaptation; prioritisation; fuzzy analytic hierarchy process; Gambia

Adaptation to climate change has been recognized as very significant for developing countries facing the greatest threats from global warming. In proposing various approaches, the IPCC and the UN have required nations to prepare their adaptation plans of action. However, none of these plans have presented priority areas in climate change adaptation. This research aims to investigate priority areas in climate change adaptation in Gambia. A tentative list of five dimensions and 25 measures of climate change adaptation was developed through the pertinent literature and interviews with experts. A fuzzy analytic hierarchy process-based questionnaire survey was designed and delivered to experts who were chosen from the committee members who prepared Gambia's National Adaptation Plan of Action. The weights of the selected criteria were determined using the fuzzy analytic network process. Results indicate that the five most important adaptation measures are public sensitization (0.0592), bushfire control (0.0575), health education (0.0553), water supply infrastructure development (0.0512), and Water security (0.0507). The findings further indicate that the top five measures all belonged to the dimension of forestry, water, and health. Moreover, the relative importance of measures can also be adopted as a reference for decision-maker to assess the perception of climate change adaptation for climate policy implementation.

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06.02 Governance of Sustainable Development

Lean and Effective Sustainability Reporting in SMEs

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Keywords: CSR report; sustainability report; GRI guidelines; Global Reporting Initiative; UN Global Compact; materiality principle

Sustainability Reporting in SMEs is still not common. Large and multinational companies are well skilled in the reporting also of non-financial topics and performance; many of them use social and environmental reporting practices internally for sustainability management and performance enhancement and externally for public relation purposes. For SMEs the situation seems to be different.
This paper discusses different starting points, conflicting purposes and good and bad experiences of SMEs with Sustainability Reporting.
The author and her team combine nearly 10 years of company coaching towards sustainability management and reporting with a sustainability research in a variety of sectors. They draw insights into SME-tailored instruments especially from a broad range of scientific knowledge transfer projects.
Main issues of the paper are:
Instruments all companies can use for effective Sustainability Reporting
Instruments that need to be adapted for the special needs of SMEs
The Materiality Principle as key to SME Sustainability Reporting
The critical issues of internal communication of SMEs
The critical issues of external communication of SMEs
Lean Reporting as the crucial challenge for SMEs
Experiences and conclusions

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Opportunities towards sustainable decision making

Integrated financial environmental information for owners, members and other stakeholders

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Keywords: integrated reporting; environmental; financial; GRI; co-operatives

Environmental impacts can have fundamental consequences both to the people living nearby and in the global scale. Interdependent value chain effects can be caused by any organization's actions from traffic planning to energy industry both across time and space. Especially in economic turmoil the effects of environmental risks can be destructive both to the economy and environment; not to mention the health of the people. Financial reporting is an essential formal rule based way an enterprise can respond to its owners', members' or other stakeholders' information needs (Guthrie & Parker 1989, Wilmshurst & Frost 2000, Gray et al. 1995). The users of the annual financial reports should be able to elicit transparent and comparable information on the enterprisers' future prospects while they concern economic, environmental, or social performance effects on the enterprise's financial position. However the information gathering of environmental effects to multiple stakeholders can be a difficult task (e.g. Adams & Frost 2007, Hodder et al. 2001). Accounting issues has been seen for a long time as a possible way to enhance both enterprises' accountability and practical efforts regarding sustainability (e.g. Gray 1992, Milne 1996, Deegan & Rankin 1997, Bebbington 2001, Lamberton 2005, Burritt & Schaltegger 2010, UNCTAD 1997). The recent results suggest that progressive and improved mandatory regulation could increase the volume and quality of environmental item disclosure. Although there remained the problems, Criado-Jime´nez et. al. (2008) took a positive view compared to i.e. Larrinaga et al. (2002) more pessimistic outlook when. The overall implications are that different countries and societies have different legal requirements and political cultures and further research was needed.

According to the World Economic Forum (2011) one of the key barriers to insufficient communication between Environmental, Social and Governance (ESG) issues and corporate financial performance is lack of clarity on which ESG factors are financially material and over which time frame. In the financial reporting context material information refers to a principle that the statements of financial position should include all material and relevant financial implications (e.g. Brennan & Gray 2005, IAS 2006, Unctad 2008). Global Reporting Initiative (GRI) -voluntary basis sustainability reporting framework defines that material information reflects the organization's significant economic, environmental, and social impacts or would substantively influence the assessments and decisions of stakeholders. E.g. De Villiers & Van Staden (2010) surveyed individual shareholders in Australia, the UK, the US and South Africa regarding publicly available corporate environmental disclosures. They found support for requirements of more specific, audited environmental information for investment decisions. The Global Reporting Initiative (GRI) announced in 2010 a goal for convergence of financial reporting and ESG reporting by 2020. The integrated information could accelerate the transition towards sustainable business practices and sustainable models of economic development.

Objective, Data and Methodology

The aim in this comparative content analysis study note was to explore what kind of explicit financial materiality of environmental issues owners, members or other stakeholders get from the audited financial statements. The objective was to explore to which extend the enterprises according to the Global Reporting Initiative - framework reporting enterprises within Food and Beverage, Chemical, and Retailer sectors or the top European agricultural cooperatives (Cogega 2010) presented environmental items in their audited sections of annual financial statements.

Retailers, food sector enterprises and the clients as consumers create a cumulative point in the supply chain (Jones et al. 2005). Supply chain pressure can be a driver of sustainability reporting and may affect to the whole product lifecycle (cf. Jose & Lee 2006, Seuring et. al. 2003,). Co-operatives contribute to the development and welfare of their societies. According to the Global300 List (ICA 2011), in 2008 the world's largest 300 co-operatives generated revenues comparable to the GDP of the world's ninth largest economy. For the members of the cooperatives the financial information is required when they use their right to vote in a general meeting; although members naturally need also non-financial information (Robb et al. 2011). The principle of democratic participation, education and provision of information is important for cooperative tradition (Henrÿ 2005).

The closer interest was in the locally identifiable information. As secondary data was utilized GRI -reports from the same reporting period to explore how far integrated the reporting practices concerning environmental items is already been evolved. The aim was not to explore the audit quality or possible expectation gap between the users and preparers but the explicit materiality the individual users can observe and hence the information opportunities they have on the basis of financial audited annual reports. The main agenda was the existence of environmental disclosure information cross-sectional latest in the subsequent publishing years 2010 and 2011.

Findings

The findings from these datasets were that although enterprises were voluntarily widely reporting about their sustainability practices and future scenarios there were fewer enterprises which showed extensively environmental details in their audited financial statements. The aspects of e.g. sustainable consumerism or production issues were discussed but less frequently in the audited parts of mandatory financial statements. The overview was that cooperatives' reporting did not differentiate considerably compared to other enterprises in the same industry, although awareness of environmental issues was figured. The combination of financial issues and wider community effects seemed to be important but challenging to report in the prevailing institutional and market framework. The locally identifiable environmental items were not common in the audited parts of the financial reports. The findings from the GRI - voluntary reports were that there is broad variety between reporting integration patterns, which can cause difficulties to combine the information from the sustainability and annual financial reports.

The paper provides insight on which environmental items were regarded material in the context of Food

and Beverage, Chemical, and Retailer sector GRI-reporters and European agricultural cooperatives. As Richardson (2009) noted 'In an era of global financial markets, the financial sector has a crucial impact on the state of the environment.' The recent state of enterprises' reporting developments is relevant when considering opportunities towards convergence of financial and ESG reporting, transparency of sustainable development, reporting incentives, or enforcement institution framework.

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The no harm model of sustainable development

Defining and grasping sustainable development

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Keywords: sustainable development; ethics; political philosophy; moral extentionism; no harm principle

Sustainable development is often interpreted as an anthropocentric concept. But if we ask the moral question: 'Who should be included in to moral circle?', and if we answer that with Bentham's moral pain axiom that it is the capacity for suffering that is morally relevant, then sustainable development should and could be expanded and reinterpreted to include nonhuman animals. If it is suffering that is morally relevant, then we should avoid harming others (in the sense of causing others to suffer). In order to grasp what an expanded model of sustainable development could entail, I propose the model called the No Harm Model of Sustainable Development. The model consists of 5 concentric circles. From outside to inside:

1. The black zone: this is (environmental and societal) collapse, and collapse causes harm (and suffering). When we have been too unsustainable for too long, we will necessarily collapse. When the carrying capacity of our planet is overshot, it will be disastrous for most life forms. There will be a mass extinction, which will probable include our own species. The black zone is the human-made apocalypse. This is what sustainability is all about: avoiding collapse, avoiding the black zone.

2. The red zone: this is the dangerous, unsustainable zone. Behavior in this zone unsustainable, that is, it is physically impossible to continue a certain practice for a long period of time. The red zone is about harming others: others are being harmed by this kind of behavior or business. By 'others' are meant: future generations, or non-human animals, people in developing nations, ecosystems, nature.

3. The orange zone: this is also an unsustainable zone, but relatively less unsustainable than the red zone. This is the transition zone. The overwhelming majority of policies and technological innovations lead (sometimes) to less unsustainable conditions, but still unsustainable. For example, when you change your SUV for a hybrid car, your lifestyle becomes less unsustainable, but it is still unsustainable. So, sustainability policies and sustainable development are often developments from red to orange.

4. The green zone: this is the sustainability zone. All behavior and practices that do not harm others, are within this zone. Practices in this zone could - theoretically - be continued infinitely. I take a broad interpretation of sustainability as such behavior that does not harm others, including (farm) animals and future generations. Often, sustainability is smaller interpreted as future generations human animals only. The green zone should be the default position of all human action. The guiding principle for the green zone is: first, do no harm. The burden of proof is on the person who does harm others. This person has to argue why it is justified to harm others.

5. The golden zone: the development zone: 'let's make things better'. This zone is about development.

The golden zone is about making the world a better place. The Millennium Development Goals for example try to reduce the amount of human suffering in the world, as do many NGO's, like Amnesty International and Oxfam. Often, people focus on the golden zone - which is good - but at the same time much of their behavior is in the red zone (and thus causes harm).

The no harm model of sustainable development is a liberal model because it takes as ground rule John Stuart Mill's harm principle.

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07/11.01 Economics & Industrial Ecology

Environmental Informatics for Industrial Ecology

Analysis of environmental ICT applications supporting eco-industrial developments

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Keywords: industrial ecology; environmental informatics; eco industrial development; industrial symbiosis; environmental ICT application; software tool

The contribution provides insights of an empirical study analyzing environmental ICT applications for eco-industrial development examples. The industrial ecology literature is analyzed identifying environmental ICT applications - i.e. software tools - currently in use or being developed for supporting eco-industrial development so far, worldwide. The study includes peer-reviewed papers and case studies being published in the Journal of Industrial Ecology (JIE) - the official journal of the International Society for Industrial Ecology (ISIE) - and other relevant sources, from 1997-2011. Drawing from the resulting inventory, a concept is developed that makes clear requirements for and movements in environmental ICT applications and that helps to group the pool for supporting eco-industrial development.

1. Aim and Scope

Environmental Informatics and Industrial Ecology are two emerging fields of research striving for sustainability. The object of Environmental Informatics is to analyze information processing, support information management and develop information systems related to the environment in its broadest sense while using methods, techniques, and tools of computer science, thereby - it is hoped - contributing to environmental protection (Page et al. 1990a, 1990b; Page and Hilty 1995; Rautenstrauch and Patig 2001; Marx Gómez et al. 2009) and finally to a more sustainable future (Hilty and Gilgen 2001; Dompke et al. 2004; Hilty et al. 2005; Hilty 2008; Isenmann 2008a). The object of Industrial Ecology is to study industrial systems and their fundamental linkage with natural ecosystems, with the aim to approach a more sustainable future (Isenmann and von Hauff 2007). According to White (1994) the focus of Industrial Ecology is ,,the study of the flows of materials and energy in industrial and consumer activities, of the effects of this flows on the environment, and of the influences of economic, political, regulatory, and social factors on the flow, use and transformation of resources".
As Industrial Ecology takes a systemic approach and goes beyond the borders of single companies or other economic entities, a key issue right from the inception of the field is to establish eco-industrial developments. These examples are sometimes announced as industrial symbiosis projects, eco-industrial-parks, regional recycling networks, zero-emission parks or sustainable supply-chains. No matter which certain label finally may be used, all these examples of eco-industrial development stand for a collective approach to competitive advantage involving physical exchange of materials, energy, water, and by-products. The keys are collaboration, resource sharing and synergistic possibilities

offered by geographic proximity (e.g. Chertow 2000, 2007). Hence all the types of eco-industrial development are usually open for economic entities from different sectors while using the entities' diversity within the industrial system in a productive manner.

While Industrial Ecology has its early focus in the 1980s in an engineering/technological- and resource/industry-focused bipolar view (Ayres and Ayres 1996), largely concentrated on physical phenomena, today the community has clearly broadened its scope to the immaterial world of bits & bytes, data, information, knowledge and the critical intersection with computational sciences.

The aim of this contribution is to investigate the state of the art of environmental ICT applications - i.e software tools - and to describe their potential benefits for eco-industrial developments and future trends. A particular focus is to advance the use of software tools supporting eco-industrial developments, especially:
o how these tools could be further developed from more or less isolated environmental ICT applications and standalone environmental management information systems (EMIS) in single companies to an integral ICT infrastructure enabling inter-organizational exchange of environmental information, and
o how to take into account and then implement the certain requirements and specific needs of companies and other stakeholders involved in long-term eco-industrial developments.

On the one hand, the concepts, software tools, and case studies included in the analysis are illustrating considerable efforts which have been undertaken since environmental ICT applications (representing the field of Environmental Informatics) and eco-industrial developments (representing the field of Industrial Ecology) became prominent, three decades ago. Closely linked to the increasing relevance of latest software tools for supporting eco-industrial developments in particular, on the other hand, it becomes clear that a lot of work needs to be done to actually run environmental ICT application in a productive manner and exploit its potential to its full extent.

As a larger goal, the contribution is an attempt to bring together the ICT-driven field of Environmental Informatics and the environmental-focused area of Industrial Ecology. Although the two fields share a number of common features, institutional co-operation and joint research could be improved, still. Progression in environmental ICT applications enable an array of unique capabilities to be employed for industrial ecology applications, especially for the management of:
o physically exchanging materials, energy, water, and by-products
o sharing other resources like infrastructure or human resources and other forms of social capital, and no less important
o relationships.

Further to a mere one-sided transfer from Environmental Informatics to Industrial Ecology, Environmental Informatics may benefit from Industrial Ecology: For example, the certain requirements and specific needs of stakeholders involved in eco-industrial developments may deliver fruitful ideas for the Environmental Informatics community as the applications of Industrial Ecology follow a more systemic view, across single entities. Computer scientists and software engineers might be interested on how to further develop isolated environmental ICT applications like standalone EMIS in single companies to an integral ICT infrastructure, enabling inter-organizational exchange of environmental

data, finally to the benefit of all decision makers involved in long-term eco-developments, be they managers, suppliers, consumers, local authorities, non-governmental institutions or other organizations affected by such projects.

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Sustainable industrial parks as resource communities

Some reflection on the arising contradictions

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Keywords: sustainable industrial park; dilemma management; resource management

In spite of all the difficulties the organization of more sustainable industrial parks is not an insoluble task. It may even be the other way round: by increasing sustainability efforts, businesses could enter into close material-flow-cooperations in the medium-term. The aim is a kind of embedded regional closed loop economy - embedded in a constellation of municipal and regional actors in order to reduce transportation costs and to increase regional value creation.
Many sustainability problems in industrial parks can be solved best through cooperative action. Of course, every business can also look for inner-organizational sustainability-increasing approaches. Hence, two (not really independent) possibilities for a sustainable development in an industrial park exist.
A sustainable industrial park can therefore be defined as a local or inter-municipal system of voluntary but organized cooperation between the different actors that share a joint vision of a sustainable preservation of their common economical, ecological and social resources. Further, actors need to be willing to accept colliding interests which must be coped with in negotiation processes.

Sustainability of industrial parks as the sum of single businesses' commitment?
What can a business do for a sustainable development on its own? Examples could be:
o The installation of a certified environmental management system or an integrated management system indicates that a business is willing to consider environmental and/or social objectives and to invest money, time and personnel in order to reduce environmental impacts.
o Social commitment in terms of cultural or social sponsorship is a clear indicator of a business's seriousness towards a sustainable development. Just as positive is an above-average commitment to apprenticeship and in-service training which constitutes investments in human capital as a resource.
o Internal measures also affect the topic work-life balance. Businesses are considerate of the multiple roles their employees play in their lives: they are involved in relationships, their family, their neighbourhood, clubs, friendships and politics. Through flexibility in terms of time, businesses support their employees in their efforts to manage the multiplicity of roles.
The more commitment one single business demonstrates, the easier it is to create a common commitment in the industrial park. These businesses might already have realized that commitment is not reflected in direct economic advantages but that it supports indirectly the business's strength and healthiness: it has an excellent reputation among customers and the employees develop high commitment.

Sustainability of industrial parks as a common task
In the rational understanding of sustainability, a sustainable industrial park, by a cooperation of all actors (businesses, municipality, citizens), is able to cultivate the sources it is dependent on. It is important to remember that sustainability in an industrial park is not a condition but a process in which

progress is made from a less to a more sustainable status because industrial parks have different starting points and different resource problems.

Networks constitute the organizational structure that contributes the most to the accomplishment of common tasks. The major task is to mediate between the single business's striving for efficiency and the common challenge to preserve the resource base.

The lecture gives an overview of the different ways of coping with these fundamental dilemmas. The main assumption is that dealing with the dilemmas occurring in sustainable industrial parks is the biggest challenge of an industrial ecology management. The way the different tensions are dealt with is the best indicator for a successful cooperation management.

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The impacts of mineral phosphorus prices and externality taxation on the use of organic phosphorus in US and their contribution for sustainable agriculture

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Keywords: mineral phosphorus fertiliser; externality damage regulation; manure management adaptation; agricultural sector model; welfare maximisation; environmental policy analysis; mathematical programming

Global phosphorus needs are rising and shortage is predicted for the near future, underlining the importance of recycling. This analysis uses mathematical programming to examine alternative hypothetical situations concerning price changes for mineral phosphorus, regulations of external damages from phosphorus fertilizers in US agriculture. We extent an existing agricultural sector model by integrating a new manure module which links phosphorous supply from livestock manure to phosphorous demand from crop production. We find that both external damage taxation and a continuation of the observed strong price trend may substantially reduce the use of mineral phosphorus fertilizers and increase the area supplied with organic phosphorous sources. Our results do not indicate a severe physical scarcity of organic phosphorous sources. Low rates of organic phosphorous at low cost for mineral sources reflect mainly the cost of manure application. The overall impact of higher cost of mineral phosphorous has little impact on aggregate crop and livestock production, trade, and prices. While the taxation of the environmental damages of mineral phosphorus, increases farmers' production cost, their income effects are positive because of market price adjustments and associated welfare shifts from consumers to producers.

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Foreign Investment and Urban Development: A Critical Evaluation

Sustainable Urban Development

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Keywords: foreign investor; economic growth; local welfare; sustainable development

A number of papers in the economics and urban literature find positive
impacts of foreign investment on cities and praise the role of foreign investors in urban development. The author argues for a different stance by developing an urban economics model for tourist cities. The model illustrates that in the presence of significant side effects, foreign investors' and a tourist city's preferences regarding openness of the city greatly diverge. Foreign investors tend to shape a city's policymaking toward greater openness. Therefore, policymakers in tourist cities concerned about sustainable development should carefully regulate foreign capital inflows at an optimal level. Evidence from Macao lends support to the theoretical construction.

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07/11.03 Economics & Industrial Ecology

Sustainable property investment

Development factors and barriers in Polish commercial property market

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Keywords: sustainable development; commercial property investment; green buildings; investor; tenants

Fundamental scientific purpose of the paper is the evaluation of economic effectiveness of construction projects, conducted in order to create sustainable buildings, to implement environmentally friendly technologies in construction and building maintenance. Analysis of hindrances and costs of modernization (construction, renovations), as well as benefits of such projects, from the property owner and users' perspective has been conducted.
The paper presents theoretical and practical background for sustainable property investment in Poland and the outcomes of the research conducted among tenants and investors in commercial property market in Poland.
The term 'sustainable development' denotes attitude towards development, which means taking care of the needs of the future generations while meeting the needs of the present by careful exploitation of resources, proper orientation of the technological development and institutional change. Research conducted in USA proof that existing building stock consumes resources: water, energy, and creates most waste in the total economy, thus creating highest costs referring to consumption of the resources, in the phase of construction and maintenance as well. One of major costs are those related to consumption of heat energy and actions undertaken in order to reduce the use of heat energy started efforts to create new technologies, new material and construction solutions which would allow for realization of buildings with lowest possible negative impact on the environment and friendly for people who use them as place of work or living. In the field of construction and property management the term 'green building' has been created. Green buildings are objects, that in the phase of construction, modernization or renewal, consciously were planned, designed and constructed using materials, technology, maintenance techniques, to reduce resource's consumption, water use, to achieve sustainable energy and waste management.
Technologies of construction and procedures of maintenance of environmentally friendly buildings are not prevalent and thus, implementation of the sustainable development idea signifies high construction costs. Though, basic question is how large is the building stock feasible to 'green' modernization, what are the costs of adaptation buildings to 'green' standards, what are the benefits to private owners/investors, that could compensate for such expenditures.
Recently, increasing understanding of the sustainable development issue among societies and growing number of investors planning or constructing new, ecological buildings and modernization of old building stock, has been noticed. Modernization into eco - buildings is probably even more important, as in the relation between existing stock and new developments, prevails existing building stock. So far,

empirical studies on the ecological construction have not been vast and refers to relatively short periods of time. And is concentrated in highly developed countries of Western Europe and USA. Current knowledge in the field of ecological construction, opportunities and barriers to development in Poland is definitely insufficient, bearing in mind how important this issue is when we consider the amount of building stock feasible for ecological modernizations.

In recent years the idea of sustainable development has been rather enthusiastically implemented into commercial building industry in Western Europe and United States. On the other hand, building certification schemes (LEED, Green Star, BREEM, CASBEE) have been successfully used in developed countries, but experienced considerable problems in less mature economies (Reed et al 2009). It is also the case of empirical research - most of them focuses on mature commercial property markets.

The bulk of previous research addressed the question of the link between ecological attributes of property and their market consequences - values, yields, occupancy rates, risk, etc. In most instances theses studies were based on US and UK data (Fuerst i McAllister 2008). There is however another area of sustainable property research which is considerably less developed, also in terms of existing literature. The problem can be addressed directly from the demand side, with well established tools of contingent valuation and conjoint analysis (see Bockstael and MCConnell). Among few studies of that kind are Addae-Dapaah et al (2009) research of the office market in Singapore and Miller et all (2008) exploration of institutional investors' preferences.

In Poland, as well as in other CEE countries that undergone transformation from socialism, the knowledge of sustainable property is not yet common among developers, investors, and finally occupiers of work space. There are more studies of sustainable buildings from building technology perspective then sociological and economical one. There is a substantial gap in the body of research on economic effectiveness of sustainable property investments, and demand for more sustainable work and living space.

On the other hand, the recent emergence of Polish Green Building Council (PLGBC) indicates that at least some professionals understand the need for more sustainable built environment. To conclude, it is obvious that the problem of sustainable built environment is worth researching from economical positions, both from theoretical, and practical reasons.

Qualitative research. Research sample has been drawn from employees of large international companies that provide commercial real estate services, and operate globally, i.e. at least in UK, Germany, Poland, Austria and Slovakia (geographic scope of the comparative study). Their expertise in linking supply (investors) and demand (tenants) side of the office market was useful when exploring scale and relations of sustainable (ecological) real estate domain. Results from qualitative research where required to construct conjoint experiment.

Supply analysis. Analysis focuses on existing commercial property stock, and evaluation of its potential to undergo sustainability driven transformation (or revitalization).

Demand analysis. Analysis of office space occupiers (tenants) preferences (stated-preference) using online survey, on dedicated webpage (Computer Assisted Web Interviewing - CAWI). Research conducted on a sample of occupiers of office space in major Polish real estate markets. Analytic procedure was the conjoint experiment. Conjoint analysis allowed to reveal tenants' preferences in choosing location of their office, and assessing relative importance of alternatives' attributes - with sustainable factor among them. One benefit from the conjoint analysis is measuring utility of ecological (sustainable) attribute in excess rent potentially paid by tenant (willingness to pay - WTP). Conjoint

analysis advantage over more direct approach is that preferences are elicited from hypothetic choices.

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Innovation in Social Entrepreneurship Related to Poverty Reduction - Including Two Successful Case Studies

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Keywords: innovation; sustainability; poverty; social; entrepreneurship

Introduction

According to Bygrave and Zacharakis (2010) and quoting Joseph Schumpeter, Entrepreneurship can be understood as the process of changing the economy through innovation in products, services, production or organizational methods, to which we can add the component risk and uncertainty, reported by Dollinger (2003). The social entrepreneurs' aim of their activity, rather than generating income, is the contribution to solving the key problems affecting society, through innovative and effective solutions. According to the UNDP Millennium Report (2010) there are still 1,200 million people in the world living with less than 1.25 dollars a day (extreme poverty) and things can go worse with the predictable increase in the food prices.

Approach

Innovation in social entrepreneurship related to poverty reduction - an approach based in social entrepreneurship considering sustainable development, population increase, utilitarianism and the Millennium Development Goals - will be explored and two case studies will be seen. We'll examine how two different organizations, one based in Europe, the other based in North America, act in order to reduce poverty, developing skills and involving citizens and communities in order to promote their sustainability in the long-term. We'll be able to compare both organisations and look at the number of projects, people and resources they involve.

Practical Implications

One important aspect of reducing poverty through social entrepreneurship is that participants in the communities are also involved in the solution for their problems, to achieve the objective for 2015 of poverty reduction of the Millennium Development Goals and to create more sustainable future for all humanity. The two organisations that were considered are two good examples of the best practices in this field and this paper can be the starting point for future research.

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Sustainability Driving Scarcities - The Potential of IT for Innovation and Value

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Keywords: sustainable development; scarcities; innovation; information technology

Sustainable Development is the big challenge of the 21st century. The depletion of limited resources will increase scarcities - and therefore costs -, partly by price mechanisms, partly by political regulation, partly by consumer demand. Furthermore, new kinds of "scarcities" will arise from the disposal of our waste and emissions. This will trigger developments, which affect both the bottom and the top line of businesses.
Scarcities have often been drivers of innovation. In the future, successful innovations will require the anticipation of the challenges of sustainability, and take into account the new kinds of "scarcities", e.g. carbon emissions or "talented workforce". In light of these scarcities, the efficient and effective management of enterprise resources will become critical. Therefore, it is important that enterprises take into account those new scarcities at an early stage, optimize their processes and their triple-bottom-line performance.

The effective and efficient management of enterprise resources has for long been the role of Enterprise Resource Planning (ERP) systems. Whereas traditionally ERP systems focused on the optimization of financial resources, the new and rising scarcities will necessitate broadening the balance and considering other kinds of resources. Business applications like ERP systems will need to provide informational transparency and enable the measuring, tracking, and reporting of sustainability performance as well as the compliance with legal regulations. The efficiency gains, cost savings, and risk reductions will free company resources, which can, in turn, be invested in innovation and development for sustainable products.

We provide showcases that ERP systems and business applications are key for increasing corporate sustainability. Among others, information technology needs to ensure access to relevant information and facilities (e.g. energy consumption or mass throughput data); to automate and innovate business processes to increase efficiency; to provide accuracy by standardization and the ability to measure sustainability performance and monitor compliance, to create accountability as well as an audit trail; and to anticipate and manage risk to people and planet.

In a final section it will be exemplified how business applications do not only support the corporate sustainability of large enterprises but can also serve social business initiatives at a smaller scale.

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08.01 Measuring and Evaluating Sustainable Development / Sustainability

Corporate Sustainability Performance from a Resource and Knowledge Perspective

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Keywords: adaptation; knowledge management; sustainability; performance measurement; metrics; triple bottom line; stakeholders

Sustainability is concerned with preserving or enhancing (sustaining) something of basic value ('the good') over time and the purpose of having a concept of sustainability is to inform a policy framework to this end. At the present time, sustainability theory, policy and practice present a confusing range of claims, proposals and concepts [1]. Three alternative conceptions are dominant in literature: sustainability as (i) the reduction of environmental impact, (ii) as maintenance and enhancement of vital capitals (= human, social, manufactured and natural capital) and (iii) as maintaining and enhancing adaptive capacity and resilience. The associated ideals and values to be sustained are (i) pristine nature, (ii) well-being and (iii) regenerative potential. In this theoretical paper we focus on measuring sustainability performance at an organizational level, and we illustrate this for healthcare corporations. In the first part of this paper we conceptualize and operationalize "sustainability" using a systemic view. In the second part we explore how to measure and quantify sustainability performance, developing a tool for Corporate Relational Footprinting and a new Strategic Performance Scorecard.

System, environment (=stakeholders) and sustainable relationships

Our conceptual research starts with system theory and systems thinking. Sustainability is a system's concept and it looks at the dynamic balance and relationship between a dynamic artificial system and its dynamic environment [2]. A system is sustainable when it is in a dynamic balance with its environment. For an organization to survive as a human social system, it needs to be adaptive and effective while interacting and coevolving with its environment. Healthcare organizations are complex adaptive systems. We focus on organizational (operational and intelligence) processes. We use a stakeholder view of the firm to operationalize "the environment". The responsibility of every social system, including corporations, is to try to improve the well-being of all those they directly affect [3]; a corporation's duties and obligations toward stakeholders are reflected in its social contract. We operationalize sustainable relationships using a capital-based view, as we focus on sustainable use of capital resources, needed for well-being. Using relational thinking we focus on durable and sustainable business relations, aimed at the well-being of its stakeholders, in the context of real social and ecological conditions in this world.

Capital-based view of Sustainability

Sustainability is a relational concept, and it is stakeholder, context and vital capital driven. These elements are the foundation for Corporate Relational Footprinting [4]. Here we look at sustainability as a function of the impacts of organizational processes on the carrying capacity of vital capitals on which stakeholders depend for their own well-being. Corporate Relational Footprinting takes the form of a quotient, S=A/N. The sustainability performance (S) of an organization, is a measure of its actual social and/or environmental impacts (A) on the carrying capacities of vital capitals, relative to what its normative impacts (N) must or ought to be (in order to ensure stakeholder well-being). We will use the theory of Context-Based Sustainability Management [5] to operationalize our Corporate Relational Footprinting tool. As we advocate the use of Context-Based Metrics to measure impact, we will critique the G3-guidelines of the Global Reporting Initiative [6], which fail to operationalize "context".

Adaptivity-based view of Sustainability

Sustainability is also about adaptation and resilience. Here organizations and stakeholders meet in open, sustainable innovation to create new knowledge to solve problems. We explore the notion of organizational sustainability in relationship with knowledge (= social capital), knowledge processing, intelligence, innovation, learning and adaptation. In order to be sustainable a (healthcare) organization needs two things: (1) knowledge about its impacts on the world and (2) the capacity to learn and innovate in response. Here we introduce two new concepts: (i) Knowledge of Sustainability (KoS) and the Sustainability of this Knowledge (SoK) [7]. Organizational sustainability performance is in part a function of Knowledge Management and of the knowledge processes within an organization. Sustainable innovation is about (i) maintaining and enhancing adaptive capacity and (ii) producing new knowledge without negative side-effects. We will use the theory of The New Knowledge Management [8] to operationalize this concept and dimension.

Defining organizational sustainability

We conclude our conceptual research, by defining organizational sustainability as a disposition or capability of an organization with two dimensions. The first is the organization's ability to adapt to environmental challenges while maintaining its own basic pattern of identity. The second is the ability to interact with the environment in such a way that it does not degrade levels of vital capitals beyond levels required by its stakeholders for their own well-being (and their future generations). These are also the internal and external dimensions of sustainability, linking knowledge ecology with natural and social ecology. Our unified framework has two theoretical fundaments: an adaptivity-based theory and a capital-based theory.

Organizational Sustainability Performance Measurement

How to measure such a complex concept? Next to indicators for input, process, output and outcome, we propose a Corporate Relational Footprinting tool for measuring the impact of organizational processes on stakeholder well-being. Furthermore we use a maturity model to illustrate the evolution of

organizational scorecards towards a new Strategic Performance Scorecard. Here we will critique the Balanced Scorecard. We use the theory of the Adaptive Scorecard [9] and the Triple Bottom Line [10] to develop a new measurement framework, linking it with internal and external stakeholders, and with a financial, economic, social and ecological bottom line. We propose to measure organizational sustainability performance with a new strategic map: the Adaptive Quadruple Bottom Line Scorecard (AQBLSC). The concepts underlying sustainability and knowledge provide a foundation for the AQBLSC. The AQBLSC provides necessary tools for thinking about indicators, measurement models and metrics for learning, adaptation and stakeholder sustainability. This is our contribution to the dialogue about the next generation of Performance Scorecards.

It will still take a very long time for mainstream health care organizations to transform towards sustainable organizations, but there will come a time that the sustainability of their activities will be judged by its stakeholders in terms of their "license to operate".

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Sustainability evaluation on urban scale

Comparative analysis of existing instruments in order to determine a method for rapid evaluation in the preliminary stages of projects

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Keywords: comparison; sustainability; urban scale; indicator systems

Introduction

The different operators (public and private customers, associations of users, designers, builders, etc..) involved in the design process and / or transformation of the built environment in micro urban scale, act with choices that are often on the edges of 'sustainable approach' culture, which requires a high capacity for dialogue supported by adequate knowledge of the disciplines and methods to predict and evaluate the effects on sustainability.
The ideal scale for addressing the sustainability evaluation appears to be the district: located on a intermediate scale between the city and the building, it offers from this point of view interesting operational potentiality, because it lends itself to experiment interventions aimed at sustainability in the urban environment, closer to urban problems that go beyond the size of the individual building.
In many cases the approach to sustainable construction is moving in a relatively small scope, often based more on environmental concerns than to the socio-cultural and economic aspects. On the other hand, existing instruments are almost designed for individual buildings, despite a substantial effort has been made to develop measurement tools and evaluation schemes for sustainable development. There are tools at statewide, regional or city specific domains such as energy or traffic.
The present paper is based on the material of a doctoral dissertation on "BUILDING TECHNOLOGY AND ENVIRONMENTAL DESIGN" at the BEST Department of the Polytechnic of Milan, which ends at the end of 2012. The work emphasizes the need to have a simplified evaluation tool to be used in the preliminary design phase of a neighbourhood, because the urban architectural choices are determined in the preliminary design stage, which potentially will have a major impact in all areas of sustainability.
To reach this goal a meticulous analysis of the state of the art and the comparison of different existing tools are essential part.

Objectives

The first objective is the comparison of different evaluation systems, in the scope of the most advanced international methods and tools for evaluating sustainable development on (micro-) urban scale. The comparison is done between a tool developed from a central European Government (NAQU-SméO, NAchhaltige Quartier by Sméo, Switzerland) and a commercial U.S. tool (LEED ND, Leadership in Energy and Environmental Design, U.S. Green Building Council, U.S), without forgetting other useful experiences for this purpose ("Eco-quartier" - France; "The special Plan of indicators of Sevilla", Urban Ecology Agency of Barcelona - Spain; "PLACE3S", Planning for Community Energy, Economic and Environmental Sustainability, California, Oregon, Washington).

"Multi criteria aggregation parameters" are hierarchically decomposed with an analytical method as far as a creation of a map of the relationships between them. There are principles that join or diversify the different evaluation methodologies. The comparison determines not only the potentiality or criticality, but also if there is a dominance of one dimension.
Other objective of the doctoral research is the transformation of such instruments applicable in a preliminary phase of the project by simplifying an existing tool, to provide fundamental indications which permit a decision at an earlier stage without preventing sustainable development during the construction or operational phase, trying to overcome the gap between science and pragmatism of the involved actors. The creation of a simplified method allows an evaluation of sustainability requirements in the initial stage of planning, to better guide the actor in the comparison and selection of projects. It intends to emphasize the character of decision-support tool in order that minimized the risk of negative impact on the sustainability of the building sector. It also highlights the importance of the instrument available to the political or strategic investor, with the hope that this contributes to assume ever greater importance.
A further objective of the doctoral research is the test of the instrument with "case studies", two architectural competitions, both in two phases, for the construction of school campuses in an urban context.

Methodology, research tasks and milestones

In order to reach the goals of the doctoral research the time planning is divided into four stages:
a. Finding policies and programs in the context of national and international scientific reference;
b. Analysis and comparison of existing tools;
c. Proposal for improvement contributions in the form of transformation of the mask emerged from the previous phase that makes it highly usable in the sustainability evaluation during the early stages of the project;
d. Testing of the tools, intrinsically linked to the time table of an architectural competition.

Results

The first two stages offer a better understanding of existing tools that are aimed to evaluate the sustainability on urban scale.
The first results are:
- the determination of a generally dominance of the ecological dimension;
- the changing from a three-dimensional approach in favor of one of four;
- gaps and potentials of the evaluation methodologies in a comparison mask.

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The Elusive Nature of Indigenous People's Rights under International Environmental Law

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Keywords: self-employed entrepreneurs/workers; occupational health and safety; bio-resource exploitation; workers in all occupations; environmental regulation; corporate behavioural change; local communities; environmental justice

To explore the way that international law can unintentionally work against the guaranteeing of the rights of indigenous people the paper provides an initial assessment of the way that the Convention on Biological Diversity (CBD) and ILO principles concerning health and safety (OHS) combine to produce unwelcome and unintended consequences. The analysis seeks to show why contemporary international environmental law relegates the rights of indigenous people, and in doing so looks at how the CBD created internationally accepted rules for resource exploitation, and which, although it envisaged possible threats and human rights violations for indigenous peoples, nevertheless failed to secure measures for protecting indigenous peoples from potential violations. In light of this, the paper reviews the commitments by actors, towards indigenous people; within the auspices of CBD, and contextually ILO treaties that deal with OHS, to assess whether the systems for ensuring that the ideals of the CBD 'trickle down' to operate effectively and equitably. By providing an initial assessment of this process the analysis starts to provide a framework for answering whether such regimes actually solve the environmental challenges facing indigenous people, and whether they promote environmental justice at the grassroots level. Questions for further analysis are identified, and the need for a more substantial piece of research to answer the questions posed, is proposed.

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Evaluation of Investments in Transport - the extended Cost-Benefit Analysis

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Keywords: cost-benefit analysis; transport economics; accessibility; regional economic effects; public transport

The development of the transport system is always subject of wide public discussion - independent if it concerns decisions about the construction of new roads or the extension of the public transport network. Particularly against the background of a careful handling of tax money there is the requirement that the transport system itself and also decisions concerning the transport systems are sustainable. Comparing different alternatives decision makers are dependent on existing evaluation methods. But traditional evaluation methods have considerable disadvantages; one example is the cost-benefit analysis.

The traditional cost-benefit analysis is based on the relation of benefits and total costs of different alternatives. One disadvantage of this evaluation method is that it does not include all of the benefits that can result in the socio-economic system due to investments in the transport systems. That means that some of the positive effects on the economic development are underestimated [3][4]. From experience, especially public transport investment for rail transport has huge regional economic impacts that could compensate for projects' high investment costs. Such indirect long-term effects result from the improvement of accessibility and the transfer of direct effects to the non-transportation market like the goods, property, and employment market. At least in theory, these benefits lead to an increase of the value added in the region. As there is no standardized method to estimate the effects on a small scale, no reliable statements about the amount of the effects can be made.

Therefore these indirect benefits are only partly included in the evaluation method of the cost-benefit analysis. Despite of that, the investment costs of transport projects are comparatively clearly quantifiable. A quantification of the regional economic effects of transport infrastructure investments would strongly affect current guidelines and evaluation methods. This would concern Austrian guidelines, but also the procedure of cost-benefit analyses in other countries that do not consider these effects. The traditional cost-benefit analysis also ignores the spatial and temporal distribution of effects - who are the winners and the losers of a project?

In Austria, efforts are in progress to improve the evaluation tool and to overcome some of the disadvantages mentioned above [1] [2] [5]. An extended cost-benefit analysis should include indirect effects on regional economy and the evaluation of the distribution of costs and benefits among different social groups.

The paper describes a possibility to improve the traditional cost-benefit analysis by considering indirect effects of investments on the economy of various regions, particularly on the labour and property market.

For an analysis of the effects of investments in the public transport system, the metro network extension in Vienna from 1991 to 2001 is used as an example [6]. The analysis is based on structural data on a small scale, travel time matrices and purchase prices for residential real estates. Different indicators of accessibility are calculated and analyzed in terms of their impact on the explanatory quality of the regression models. The results show clearly that effects on the employment and property market

seem to be relevant; whereas effects on the property market are only marginal compared to the effects on the employment market in the case study. The benefit is generated on the one hand from additional jobs that could lead to additional value added in the following years. On the other hand there is a one-time benefit from value increases for a residential property. The results are compared with benefits that are assessed for investments in road infrastructure.

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08.02 Measuring and Evaluating Sustainable Development / Sustainability

The role of local authorities in stimulating pro-environmental behaviour change in the borough population

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Keywords: pro-environmental behaviour change; local authorities; sustainability performance; UK

The Climate Change Act 2008 legally binds the UK to reduce greenhouse emissions by 34% by 2020 and 80% by 2050, based on GHG emission levels from 1990 (DECC, 2008). Individuals are responsible for over 40% of the UK's energy use and carbon dioxide emissions (DTI, 2007; DEFRA, 2008). This significant contribution to overall GHG emissions by individuals demonstrates the importance of the individual and their choices and actions in reaching these reduction targets. Attempts by government to promote pro-environmental behaviour change have started to become an integral part of the policy response to these targets (DEFRA, 2008; The Cabinet Office, 2011). However, the impact that this change in behaviour will have on reducing emissions is ambiguous, with little evidence in existence as to what the different behavioural changes equate to in terms of carbon savings and how different behavioural changes are enacted.

This piece of on-going research has focused on the role of local authorities as a vehicle for stimulating pro-environmental behaviour change and aims to give insight into why sustainability projects do or do not work to encourage pro-environmental behaviour change. Data was collected through a series of exploratory, semi-structured interviews with sustainability officers from eight inner London local authorities in the UK. Interviews were undertaken between October 2011 and April 2012. Data collected specifically attempted to ascertain what evidence there is that local authority sustainability projects stimulate pro-environmental behaviour change in the borough population and what affects the success or effectiveness of such projects. At this stage, seven of the eight interviews have been analysed.

To date, 46 sustainability projects were identified in the transcripts, of these 23 have been analysed. All sustainability projects analysed interacted with the borough population and were delivered by the local authority. Projects that focused on businesses or the local authority's estate were excluded, as were projects that were primarily led by other organisations. Sustainability projects analysed included food growing projects, knowledge campaigns, home energy audits and 'zone' projects. Zone projects focus on a geographical area in the borough where action is being taken to reduce the environmental impact of the residents in the area. Green champion and green pledge schemes were also discussed by more than one council. Other sustainability projects delivered by the councils aimed to increase recycling participation rates, or promote sustainable travel, renewable energy and even composting. Most council's assisted local businesses to reduce their carbon emissions and all undertook measures to reduce their corporate carbon emissions but these projects were excluded from analysis because they did not focus on borough residents.

Interviewees were asked specifically which of the sustainability projects had been the most successful and in their opinion, why. Reasons given varied but there were some consistent themes. Funding was noted as a factor that led to more successful projects. Local political support was also identified as

important and projects that incentivise the population to engage were viewed as successful by multiple councils. Projects where the council worked to build capacity in the community were also noted as successful, as were those where the council provided facilities to support the project and worked to remove barriers. Electorate support (such as lobbying) for projects also helps achieve a successful project outcome.

Emerging results from cross-borough analysis of the successful projects identified that there is a link between the delivery approach of the project and the effectiveness of the project. To investigate this further projects were assessed against Defra's 4E's model (Defra is the UK Government Department for Environment, Food and Rural Affairs) to identify whether the project Encouraged, Engaged, Enabled and Exemplified. The outcome and identification of a sustainability project as 'successful' was clearly pertinent to this piece of work. Therefore prior to analysis of the interviews, interviewees were asked to identify the objectives of the project and verify whether each project met these objectives. They also scored the project on its effectiveness and overall success. This information was then used as an indicator of the success of the project.

Results showed that there is strong link between successful projects and firstly projects where the council has enabled resident participation by facilitating the project, for example through financial support, training or empowerment and secondly, where the projects were delivered in collaboration with the council, or even led by the community. Collaborative projects may be more successful because they target a particular segment of the community however these projects rely on a good working relationship between the borough population and the local authority and often pre-established links.

Council led projects with a 'one-size fits all' approach were identified as tending to be less successful because they present a difficult vehicle through which to engage the public. Projects that were intrusive also discouraged engagement. It should however be noted that large council led 'one size fits all' projects, are more likely to be one-off energy saving projects like home energy audits which can deliver significant carbon savings over the long term, without requiring a behaviour change.

From this research, it has become clear that a methodology to measure the impact of sustainability projects that aim to stimulate pro-environmental behaviour is little developed. Throughout the interviews, sustainability officers at the different councils each expressed the difficulties and challenges in obtaining a measureable output of the projects and how this can act as a barrier to the initial inception of the project, its progression and further funding.

This research has uncovered the need for a more in-depth understanding of the factors that influence the success of sustainability projects; this piece of research has made a contribution to this. It has also identified a significant need to develop a clear methodology to evaluate sustainability projects, so that projects can be measured against each other and their success can be evaluated in terms of actual environmental impact, for example, by quantifying associated carbon reductions.

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Role-determined information needs of sustainability management control

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Keywords: information management; sustainability management control; eco-control; (sustainability) balanced scorecard; sustainability management; roles

Sustainability issues increasingly influence the economic success of companies and have become an important influence on corporate strategy, risks and opportunities. As a consequence of increased pressures, many companies have developed formal strategies and policies for sustainability management. In many other companies sustainability management has emerged from a variety of environmental and social management activities.

Whatever the source of development, in the process of operationalising and implementing sustainability strategies and in order to practice corporate responsibility for sustainability, it is necessary for managers and employees at all levels to be aware of and committed to the implementation of sustainability management (see e.g. Ballantyne and Gerber 1994). In this context, internal acquisition and management of sustainability information is established, and becomes institutionalised, to provide a foundation for development of awareness and the implementation of social and environmental goals, strategies and measures.

The general notion of corporate (social) responsibility is vague about who specifically is responsible for sustainability goals and replaces the notion of individual responsibility with a legalistic corporate notion. Identification of specific, individual and group internal responsibilities is, hence, required if sustainability matters are to be successfully addressed. New management control systems and associated information exist to introduce incentives for moving towards sustainability. In this process of implementation formal and informal approaches to the gathering of sustainability information and to sustainability management control are developed and various professionals with sustainability-related roles are assigned responsibility and/or choose to create and use social, economic and environmental information. However, little is known from prior research about the influence of roles in sustainability management on the relevance of certain properties of sustainability information collected and used in management decisions.

The definition and shape of management roles may be influenced by the reasons why a company has established sustainability management. Some companies deal with sustainability because of competitive pressure (e.g. Porter and Esty 1998), some to cut costs (e.g. BCG 2009), some to increase their level of innovation (e.g. Preuss 2007), others to attract and retain a motivated, highly skilled workforce (e.g. Ehnert 2009), and many to ensure legal compliance (Fichter 2006; Hockerts 2008; Preuss 2007), or for legitimacy reasons (e.g. McWilliams & Siegel 2001). Also for some it is a matter of following peers and industry norms and expectations (Chen et al. 2008).

This paper thus investigates a set of hypotheses about the interrelationships between different management roles and their influence over the type of sustainability information collected, processed,

communicated and used. Subsequently, the information needs of the five types of roles were analysed against the previously formulated hypotheses. For diagnostic purposes the analysis of results is structured according to the sustainability balanced scorecard (Figge et al. 2002) as related information management is focused on translating sustainability strategies into action and as it is performance orientated and facilitates analysis using multi-directional causal chains. The results were analysed in accordance with information properties previously discussed in prior literature or emerging in the course of the research. Such data properties are i) environmental, social and financial information, ii) monetary and non-monetary (physical) information, and iii) qualitative and quantitative information.

Empirical analysis is conducted on the basis of interview data with managers in leading German and UK companies where 103 different sustainability roles were identified in the dataset.

The initial chi-square test results indicate that for all types of information except physical information, the demand significantly differs between different role orientations. The largest differences between roles exist for the use of qualitative, monetary and social information.

Several of the hypotheses are supported by the data. Sustainability managers with a focus on financial performance were observed to collect and use more monetary, economic and quantitative information than other sustainability managers. The analysis of the data also reveals that managers with an internal process orientated role have a higher demand for physical, monetary, environmental and quantitative information.

Other hypotheses could not be supported. For example there was no conclusive indication that market, marketing and customer orientated roles primarily require physical, social, environmental and qualitative information as most roles in the sample require these kinds of information. Although for qualitative (8.8% above average) and social (+0.8%) information a slightly higher demand for sustainability information was found, environmental information is not used more often than by other roles. The same phenomenon can be observed for quantitative information.
The empirical results of this exploratory study show that in the companies analysed a wide range of different actors are dealing with sustainability information. Furthermore, the kind of sustainability information collected and used is significantly influenced by the role of these actors. One consequence of this finding is that sustainability management control should explicitly consider who is assigned to create and use sustainability information. Identification of the roles indicates who is responsible for sustainability information management, how to prevent unintended biases and to ensure a balanced and strategy supporting management of sustainability information.

Based on the results it is suggested that a process-orientated sustainability management control approach best supports coordination and integration of sustainability information management and does justice to the interdisciplinary character of sustainability management.

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Evaluating the promotion of equity in REDD+

The case of Bolivia and Indonesia

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Keywords: REDD+; equity; FPIC; Bolivia; Indonesia; evaluation framework

Reducing deforestation is a key issue in the promotion of sustainable development. The topic has gained prominence in the debate about climate change mitigation in the past decade, as it addresses some 18% of global greenhouse gases (GHG) emissions [1]. One of the mechanisms proposed to deal with the problem is REDD+, which involves providing financial incentives for developing countries with a view to "reducing emissions from deforestation and forest degradation" and may also include "the role of conservation, sustainable management of forests and enhancement of forest carbon stocks" (FCCC/CP/2007/6/Add.1, para. 1biii).

The rationale underlying REDD+ is that, when offered the proper economic incentives, developing countries and forest-dependent communities will keep their forests standing, allowing for climate change mitigation. Though the precise format of the mechanism is still under debate at the global level, many pilot initiatives have been carried out or are under implementation. In spite of the apparent "win-win" practical solution to sustainability that REDD+ represents to its proponents, implementing such mechanism in an equitable manner for forest-dependent communities presents complex challenges for policymakers.

The objective of this paper is to shed some light on the challenge of how to better promote and evaluate equity in the context of REDD+, especially for indigenous and other forest-dependent communities. To this effect, we explore the way in which the issue of equity has been addressed in two REDD+ initiatives from countries that occupy a prominent position in the debate about the format that REDD+ should take: the Noel Kempff Mercado Climate Action Project in Bolivia (NKMCAP) and the preparation phase of the UN-REDD Programme in Central Sulawesi Province, in Indonesia.

We begin by exploring the relevance of the concept of equity for REDD+, and the issues that are usually implied in the use of the term "equity" in this specific context. Following this discussion, we propose an analytical framework that can be applied to the case studies. Departing from the framework developed by McDermott et al [2] (which comprises the parameters of goals, scale and content of equity), we argue that it is necessary to broaden the analysis of context before REDD+ implementation in order to offer a more accurate understanding of the impact of REDD+ on equity for the actors at the local scale.
Applying this framework to the cases of NKMCAP (Bolivia) and the preparation phase for the UN-REDD Programme in Central Sulawesi Province (Indonesia), we identify equity issues to which policymakers should be attentive and that must be addressed in the current debate about the shape that REDD+ could take in an international climate change mitigation regime. [3]

We find that REDD+ initiatives make evident - and may even amplify - inequalities that already existed in the communities before their implementation. We conclude that equity should be included as a guiding principle in REDD+ activities, and that project design must take preexisting inequalities into account, introducing mechanisms to compensate for them. Conflicts related to land tenure and access to resources must also be addressed when implementing REDD+ activities, to avoid increased marginalization of indigenous communities.

The study highlights the importance of conducting a careful assessment of the initial context in terms of inequalities and their relationships to institutional arrangements in REDD+ initiatives. The current approach of designing socio-environmental safeguards adopted by UN-REDD could be complemented by these assessments, in order to identify potential issues that could be a barrier for the promotion of an equitable outcome in REDD+ initiatives. We suggest that this assessment of the context could be performed by UN-REDD in cooperation with other related UN agencies such as UNDP and UNEP and other organizations specialized in socio-environmental issues like IUCN. At the same time, the improvement of livelihoods depends on other factors that are out of the scope of initiatives like REDD+. Though REDD+ may draw the attention of policymakers to the needs of indigenous and forest-dependent communities, it is the responsibility of States to promote institutional reforms that could facilitate the impact of mechanisms like REDD+ in reducing the existing inequalities that affect those communities.

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08.03 Measuring and Evaluating Sustainable Development / Sustainability

Assessing the role of external stakeholders in setting the importance of sustainability and mass customisation indexes

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Keywords: stakeholder analysis; system dynamics; sustainability index

Motivation

The design and management of a Sustainable Supply Chain (SSC) being able to provide the markets with Mass Customised products and services is a complex task that can require huge investments and thus bound the supply chain evolution over a long time interval. These strategic decisions have to be taken in a highly uncertain context, this is especially true looking at sustainability issues. In fact, sustainability is by definition multidimensional and can be evaluated taking various viewpoints. In particular, along the journey a company has to undertake in order to include sustainability issues in its agenda, there is the need to engage stakeholders, meaning integrating and understanding them during the decision making process. A clear knowledge of the stakeholders' behaviour and influence can, in fact, drive the identification of priorities in terms of sustainability related actions. Furthermore, the relative importance and target level of a given Sustainability Index (SI) can vary in function of the elapsed time. This evolution is the result of the interactions among many stakeholders, all having different objectives and behaviours.
The suitability of the strategic decisions resulting into a specific SSC configuration is thus not only strongly dependent from the current importance of the various SIs, but also by their possible evolution on a medium-long time horizon. Being able to assess how the importance of the SIs is expected to vary over a long term horizon is a critical element supporting these decisions. This can be done by analysing a multitude of scenarios describing the potential outcome of stakeholders' interactions and impacts. The description of these interactions should account for: non linearity, time lag (an action can influence other stakeholders only after a given lag time), complex indirect relationships (the mutual influence between two stakeholders can be mediated by their interplay with other stakeholders).
The complexity of the problem to be studied, its inner multi-dimensional nature (many actors, many actions, many objectives) and its high level of uncertainty call for a formalised and structured methodology for assessing the evolution of the importance of the considered SIs and its impact on the choices made by SSC decision makers.

Methodology

This work aims to present a conceptual model that represents how actions taken by various stakeholders and their interrelationships influence the importance of the various SIs. Causal loop

diagrams (Stearman, 2000) are used as a tool to map the above mentioned impacts. They show in a qualitative way the feedback structure of a system, the elements of a system (variables) are identified and described with nouns or noun phrases while arrows are used for connecting them, denoting the causal influences among the variables. Polarities are assigned to arrows in order to denote if the causal links is positive (the value of the variables evolve in the same direction) or negative.
According to the Bruntland report all the three aspects of sustainability (economic, social and environmental) are considered for assessing the influence of the various stakeholders. Stemming from the idea that Mass Customisation (MC) paradigm can positively influence Supply Chain sustainability (Pedrazzoli et al. 2011), the impact of the various stakeholders on the importance given to MC indicators is also evaluated.
A lot of detailed indicators can be used for assessing the different sustainability aspects, however, in order to keep the complexity of the feedback loops to a manageable size and thus ensure their understandability by not experienced users, the modelling of stakeholders' impact is described at an aggregated level. A hierarchy of indexes has been created in order to represent, at various level of details, homogeneous classes of performances. For instance, "Environmental indicators" have been divided into: Emissions, Use of resources, Waste.
To start the development of the conceptual model, the set of relevant stakeholders have been identified on the basis of the literature: governments, suppliers, competitors, customers, non-governmental organisations, local communities, labour unions, creditors, certification institutions. For each stakeholder the list of actions potentially influencing the importance of Sustainability and MC indexes has been then established. The relationship among a single action and an indicators' category can be direct or being mediated by additional causal links involving additional support variables. It has to be noted that various actions can impact the importance of a given SI and that the polarity of the various actions can be different. Furthermore, the same action, for instance looking at Government "Tax on Sales", can influence in different ways the importance of a given SI, for instance "Profitability". "Tax on Sales" have both a direct and an indirect (due to decrease of customer preferences for a more expensive product) negative impact on "Profitability". The overall importance of the SI cannot be thus identified in an easy way since it results from the interactions of different elements that have to be considered simultaneously.

Results and conclusions

The complex relationships among the external stakeholders and the indicators' categories have been identified and qualitatively described. The role of Government appears paramount, this is due to the wide range of actions that it can deploy in order to reach specific objectives. Another group of external stakeholders (NGOs, Local communities and Labour unions) is characterised by its capacity to exert pressures on Government in order to partially shape its actions. These external stakeholders also directly influence the SIs importance through Lawsuits, Claims, Boycotts, Complains, etc. The last group of external stakeholders (Competitors, Suppliers, Creditors, Certification Institutions) mainly influence the SIs importance by changing the competitive context in which the company evolves. Thus, for this group the majority of the causal links are indirect and mediated by the supporting variables, such as Customer Preferences.
The conceptual model allows to qualitatively assess the influence of the external stakeholders on the

importance of indicators' categories. It will be used for simulating and analysing many long-term scenarios, where "all" the potential outcomes of external stakeholders interaction are tested in order to find out which could be the realistic relative importance of the various SIs and thus support the decision makers in designing and managing the SSC accordingly.

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The use of Farm Business Survey to evaluate agricultural systems

The case of Anglian river basin catchment

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Within the agriculture sector water has a number of uses including irrigation, spraying, drinking for livestock and washing (vegetables, livestock buildings). Some farms abstract water from rivers and boreholes whilst others rely solely on the mains supply (Charlton et al. 2010). One of the main impacts of climate change to agriculture in England will be to change the availability of water in general (DEFRA, 2010). The impacts will be spatially and temporally variable (UK Climate Projections, 2009). Changes in extremes of water shortage will lead to changes in drought frequency, magnitude and duration (Charlton et al. 2010). The Anglian river basin catchment in the east part of England will face high pressures due to high abstraction rate for agriculture and also due to scarcity in water availability because of increased temperatures and reduced perspiration (UK Climate Projections, 2009). Moreover, for irrigated root and vegetable crops, the continued production in the south and east of England will be dependent on assuring adequate sources of water for irrigation.
The study is identifying environmental and climate parameters that are highly related to the efficiency of farming systems. Moreover, the relation between water use and efficiency is examined. Data for analysis at farm level is derived from the Farm Business Survey in England. We employ the DEA double bootstrap of Simar and Wilson (2007) to estimate and explain productive efficiency. The technique overcomes sever limitation inherent in using the two-stage DEA approach commonly employed in the efficiency literature. In the first stage, the levels and trends in efficiency among different farm types in the Anglian river basin catchment are estimated. At a second stage, regression is employed to explore the relationships among efficiency and environmental and climate parameters that affect the sustainability of farming systems in East England under the pressures of climate change.

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Applying the Capability Approach to Empirical Sustainability Research

Three Case Studies about the Valuation of Biological Resources in the Rural Livelihood Context of Nepal

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Keywords: operationalisation of the capability approach; evaluating sustainability; empirical sustainability research

Sustainable development (SD) is about the safeguarding and development of human wellbeing against the background of fragile and finite ecological resources. A concept of sustainable development should therefore function as a guiding principle for shaping our future. As an action guiding approach, it claims to taking into account sustainability criteria as guiding principles in view of environmental, social, political and economic challenges (see Burger and Christen 2011). The Capability Approach (CA) as a human centered approach to wellbeing is deemed to be promising as metric for wellbeing into a sustainability conception. Furthermore a conceptual sustainability framework based on the CA can be fruitful in terms of operationalizing a specific sustainability issue.

However, there are several debates within academia regarding the CA as a metric for human wellbeing in general and regarding its suitability for a SD framework in particular, which need to be addressed when considering a capabilities based SD framework.

One major debate within the capabilities literature concerns the incorporation of the collective dimension into the mainly individual focused CA. Here, the role of capabilities not solely for individuals, but also in terms of one's livelihood and social structure and in terms of an enabling environment for creating an individual's capabilities is claimed to be important. In order to apply the CA to a conceptual SD framework, there is a need for further exploration of this question.

Another important issue regards the question how capabilities matter in relation to sustainability. A capabilities based SD concept must take into account the recursiveness between the societal and the natural sphere, the dependency of the society upon natural resources and the fragility and limitedness of natural recourses (Burger and Christen 2011). The main question in terms of the CA concerns the point of connection between the CA and those SD assumptions and how non-ideal circumstances can be considered in a capabilities based evaluative space (Christen et al. 2012).

In order to find answers to these issues and to test the adequacy of a capabilities based SD concept, both in terms of its theoretical consistency and in terms of its applicability to real world sustainable development issues, there is a need for empirical sustainability research.

Against this backdrop, the purpose of this paper is to demonstrate how a capabilities based sustainability framework can be empirically applied to a recognized sustainability issue, namely the sustainable use and conservation of biological resources in the rural livelihood context of Nepal and its impact on people`s quality of life. Regardless of numerous threats that result in call for the protection of biological resources, Nepal possesses a remarkable diversity in its biological resources that could be used for improving life quality and sustaining livelihood of many people. By putting the CA in the center of the valuation approach, a new understanding in terms of improving individual life quality through biological resources and its use is being highlighted. By applying the CA, not only direct benefits in terms of income or goods are considered as important, but it is also possible to identify people`s

opportunity space in order to understand barriers as well as drivers for development in a holistic view.

Method

The empirical research is based on three case studies in remote villages in mountain and hill regions in rural Western Nepal. The case studies were conducted using explorative, qualitative in-depth interviews and qualitative participatory methods (focus group discussions and working groups) to determine how the local population made use of biological resources and how this impacts their wellbeing (both on an individual as well as at the collective level). A total number of 15 in-depth interviews, three working groups and two focus groups were completed.

Expected Outcome:

With the empirical results, the paper will address the existing debates within the capabilities and SD literature that are outlined above: The individualistic CA will be tested against a rural livelihood background in Nepal. Therefore, a framework based on Nussbaum`s ten central capabilities (Nussbaum 2000), but complemented with the Sustainable Livelihood approach (SLA) and Ostrom's Social-Ecological System (SES) will be applied.

Furthermore, the relation between the sustainability assumptions of Burger and Christen (2010) and the understanding of human's wellbeing will be illustrated by the example of the three case studies. Accordingly, the identified capabilities of the interviewees will be analyzed against the backdrop of the issue of non-ideal circumstances in terms of an evaluation space raised by Burger and Christen.

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Evaluating the sustainable development strategy of the European Union and Hungary through the sustainable development indicators

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Keywords: national sustainable development strategy; sustainable development indicators; European Union and Hungary; monitoring sustainable development strategies

Since 1992, when the United Nations Conference on Environment and Development was held in Rio de Janeiro, sustainability is a widely desired concept all over the world. Sustainable Development Strategies (SDS) are launched by the policy-makers to define how the nation can manage to reach sustainable development. Each SDS contains a set of indicators that measure the progress achieved in the social, economic, environmental and institutional dimensions. A national sustainable development strategy (NSDS) can be defined as "a coordinated, participatory and iterative process of thoughts and actions to achieve economic, environmental and social objectives in a balanced and integrative manner." [1] As institutions, capacities and sustainable development priorities differ state by state, no general structure can be defined for an effective NSDS. Each country has to determine by itself the development goals and how to develop. According to the report prepared by the Division for Sustainable Development of the United Nations Department of Economic and Social Affairs, 106 member states of the UN were implementing a national sustainable development strategy in 2009 and 13 countries reported that they are developing an NSDS. [2] Besides the national strategies, regional commitments exist as well, such as the European Union Sustainable Development Strategy.

The EU Sustainable Development Strategy was launched by the European Council in Gothenburg in 2001 and revised in 2006 and 2009. The evaluation of the implementation of EU SDS is supported by the monitoring report of the Eurostat published in every two year. The sustainable development indicators of the EU SDS can be divided into ten themes and of the more then 100 indicators 10 have been identified as headline indicators.

Hungary, member state of the European Union since May 2005, implemented the National Sustainable Development Strategy in 2007, renewed strategy is to be implemented in 2012. (under development). Eleven priorities are defined, and for the monitoring 10 indicator groups were elaborated similar to the EU SDS. [3], [4]

In this study I would like to make a comparison of the sustainable development strategies, the set of indicators and the progress in the European Union in general and in Hungary by analysing the European Union Sustainable Development Strategy, the Hungarian National Sustainable Development Strategy and their monitoring reports published by the Eurostat and the Hungarian Central Statistical Office. [5], [6]

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08.04 Measuring and Evaluating Sustainable Development / Sustainability

Determining indicators of socio-cultural sustainability for protected areas

Example of National Park Plitvice Lakes, Croatia

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Keywords: national park; population; identity; indicators; tourism

Demand for destinations of protected nature in modern tourism is increasingly larger thanks to its authenticity and the desire of modern man to reconnect with nature. Success of protected areas is certainly in close contact with an attractive resource base (Kušen, 2002) which whit its diversity and uniqueness attracts tourists with different interests. Therefore the preserved space is resource, which is unique and it is impossible to reproduce it in its uniqueness. Consequently, tourism environment and communities are in continuous feedback, which by its nature is positive in early and less intense stages, but with the increase in tourist activity leads to negative feedback (Martinić, 2010.). In order to achieve a balance in tourism development and nature conservation there should be responsible and planned use of space access, and inclusion of inhabitants of the area in the processes of nature protection and tourism.

Protected nature areas are often neglected in the analysis of sustainability, usually due to the attitude that these are areas are sustainable in itself because of its environmental conservation, even though there are numerous examples that prove otherwise (Pravdić, 2003; after Welford et.al, 1999). Protected areas, as one of the most interesting tourist resources daily experienced an attack on their environmental sustainability, which is severely affected in some areas, particularly by tourism. On the other hand, socio-cultural sustainability is often neglected due to excessive conservation of protected areas that restrict economic and demographic development of the local population.

In these areas, besides the ecological sustainability that must be the framework for all other dimensions of sustainability, it is necessary to take care of sustainability of identity, population, landscape and tourism. These segments should be emphasizes as the basis of the uniqueness of the protected areas, which is characterized not only by its biological diversity, but also the unique identity of the population that has shaped the landscape of the area with their small, but meaningful actions.

As an example to reason the sustainability of protected natural areas in this paper was selected Plitvice lakes National Park. Accordingly, aim of this paper is to consolidate all dimensions of sustainability of crucial importance for sustainable development of a protected area and give a new perspective to socio-cultural sustainability. Designing the new principles and methods through which we can achieve sustainability of natural areas is necessary for the realization and operation of the system of natural reserves. That should be achieved through exactly shaped targets, categories of management, identifying previous failures, measurements of conditions and possible vulnerabilities, and identifying differences between research and management (Shafer, 1999).

Protected areas in Croatia comprise approximately 10 per cent of the national territory, which is a relatively high share, while national parks cover 961 km2 and consist of an area of supreme national interest.

Plitvice Lakes National Park is set as an example for determination of indicators because it is the largest national park in Croatia, and also the most burdened by the number of visitors. Plitvice lakes are characterized by complex geology, diverse landscape, unique mosaic of lakes, rivers, forests and meadows, rich biodiversity, rich cultural heritage and the history of tourism. Currently Plitvice don't have the adequate set of indicators of sustainability so there is a great need to determine sets of indicators that would allow continuous monitoring of conditions with possibility of their correction. In the area of national parks there is often a lot of attention devoted to environmental sustainability and sustainability of tourism, while the local population sustainability is often neglected.

When it comes to determining the viability of the identity of the local population we must take into account that this is probably one of the hardest measurable dimensions of sustainability due to lack of concise indicators. The most applicable indicators in this area of sustainability are: belonging to the region, participating citizens in traditional cultural and artistic societies, the number of second homes, share of allochthonous population in total population and the share of employed in primary sector. The second segment of sustainability related to socio-cultural sustainability is population viability. National park Plitvice lakes is located in less populated rural area where population sustainability in the national park and in the surrounding area also represents one of the important dimensions of sustainability, cause of enormous decline of population. Trough the analysis of accessible date some easily measurable and applicable indicators where chosen: population trends by age and sex, the availability of education, types of public services available in the first largest settlement, the number of employees, number of business opportunities, income per capita and birth rate.

Taking into account these parameters it was found that the socio-cultural dimensions of sustainability of the national parks that represents the identity and viability of the population was completely ignored and it is beyond the focus of management of national parks that should be responsible for monitoring the overall sustainability of the area. Consequently there is a huge decline in population in the area on National park Plitvice lakes, in the period since 1991. to 2011. population of the administrative units in whose area is a National park fell on average by 11 per cent. This is partly triggered by independence war in ninety's and enhanced by insufficient opportunities for local inhabitants. Also there is a mass determination of local identity in its traditional form, while there is increase of false identity which is artificially created for presentation in tourism. This modern identity is mostly spread between younger population which has a greater role in tourism activity. Thus there is a need for determination of social carrying capacity.

By monitoring all of these indicators and setting the desirable objective it is possible to monitor sustainability of population in space that is too often seen as a natural intact area, which negatively affects not only to the structure of the population, but also the identity of the natural areas that are already there for centuries in harmonious coexistence with residents.

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Ignorant or gatekeeper? What role do accountants play in the sustainability accounting practice?

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Keywords: sustainability accounting; accountant; role; involvement; gatekeeper

With the growing regulatory, societal and business relevance of sustainability many managers need more sustainability information than in the past. As a central information system of the company, accounting is challenged to provide such information and to support sustainability management. Social and sustainability accounting, as the area of accounting dealing with sustainability information, has been actively researched since the beginning of the 1990s. The understanding of what comprises sustainability accounting varies, yet the potential benefits of its application are emphasised in a growing number of publications. Improved basis for decision making (e.g. Gibson 2006), improved recognition of important aspects of business (Norman & MacDonald 2004), improved efficiency (Hanley et al. 2009) and thus lower cost of related activities, and a legitimacy gain (McWilliams & Siegel 2001) are some commonly cited advantages. The question is thus what the role of accounts could be and is to foster social and sustainability accounting. Whereas the theoretical contribution of accountants for sustainability in companies has been dealt with (see e.g. Gray & Collinson 2002) less is known about their actual role in corporate practice. The role of accounting professionals in sustainability accounting structures and processes in corporate practice remains a relatively under-researched area.

Numerous publications emphasize that accountants should be involved in sustainability management (e.g. Benston 1982; Christian 2010). Various empirical publications, on the other hand, point out the fact that accounting professionals are insufficiently involved in sustainability activities (e.g. Davey & Coombes 1996) and even criticise management for authorising "the accounting function to produce social and environmental information, even when the accounting profession does not show any interest" (Mathews 1997, p. 504). Empirical research has focused on the expertise of the accountant professional - applying accounting methods and tools. Extant literature has, however, neglected the reasons for the non-involvement of accountants in sustainability accounting.

This paper looks into the involvement of accounting professionals from the perspective that accountants can be seen either as promoters or as gatekeepers of sustainability information. Since the power of information has been recognised for a long time (e.g. Galbraith 1974), we investigate whether accountants are ignorant or not when it comes to sustainability information, and if not, whether they are involved as promoters supporting sustainability activities or whether they are gatekeepers contributing to retaining established power structures in companies.

With the overarching objective of exploring the corporate practice of sustainability accounting, a research project was set up and conducted between 2009 and 2010, whereby 60 respondents fulfilling 103 roles in 16 British and German-based companies were interviewed in person. One of the objectives was to explore the role of the accountant in corporate sustainability accounting. A focus on companies with good sustainability reputation was pursued.

Firstly, we found that accountants are involved, however, to a lesser extent than other professionals such as sustainability managers and production managers. Thus, a larger than average share of professional accountants exercise a lack of interest. Secondly, we examined the role of those

managers who are involved in sustainability accounting. Whereas most of the different identified professions (such as sustainability managers, general managers, production managers, etc.) are represented evenly along the process of sustainability information identification, generation, provision and use, the accountants' function is concentrated on the identification of information that is generated and on the provision of the final output. Compared to other accounting processes, these are clearly gatekeeping functions (Marsden 1982). In summary, the role of professional accountants in corporate practice can thus be characterized as either being ignorant or gatekeeping.

In the search for an explanation for the described gatekeeping we propose three types of involvement of accountants in corporate sustainability accounting. On the one hand, gatekeeper can be seen as the result of the appended nature of the sustainability department and the subsequent need of interpretation of the results into "management language". We refer to this as adaptive involvement to describe the situation where accountants communicate the information they are fed in.

The second interpretation why gatekeeping exists is the limited ability of accounting professionals to engage in sustainability management that leaves them no other option but to act as mediators rather than to support the process with their expertise. We call this constructive involvement, whereby accountants recognise major deficiencies in communication of sustainability information and try to contribute to overcoming them.

A third reaction pattern is defensive involvement. If accountants fear losing power in organisational structures, they may use their core position in influencing and managing information flows. This allows accountants to retain or tweak information to avoid changes in (power) structures. Support for this can be found in existing literature dealing with the accountants' attempt to strengthen their positions. Power (1997, p.123) describes this and other "strategies by which they [accountants] have attempted to represent themselves as relevant experts" in environmental audit.

This paper discusses the results of an exploratory empirical analysis of the existence of these roles in corporate practice. The implications for accounting practitioners are two-fold. Sustainability accounting projects should seek to engage accountants beyond their gatekeeping role and to develop a promoter role. Furthermore, accountants can contribute significantly, firstly with their expertise in dealing with figures and secondly with their contacts with other departments by helping them to engage for corporate sustainability.

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The development of framework for corporate sustainability assessment

A case of sugar manufacturing

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Keywords: corporate sustainability assessment; sugar manufacturing; multiple criteria decision analysis; evidential reasoning

Corporate sustainability is the ability of a business organisation to indefinitely maintain itself (Moldan and Dahl 2007). Sustainable development is widely recognised as the concept of balancing and satisfying the triple bottom line: economic, environmental, and social development. Towards the above definition, quality is integrated into the sustainability context in order to strengthen the ability of a manufacturing company to sustain their business in the long-term competitive market.

Through integration, quality perspectives could broaden sustainability initiatives in terms of an efficient internal process and customer perceptions. Focusing on quality allows a company to gain a competitive advantage from offering products and services that meet customer needs and expectations (Forker et al 1996). Nevertheless, it is apparent from literature sources that contrasting perspectives exist where the synergy of sustainable development and quality improvement are concerned and that this is because an improvement in one aspect may present an obstruction to improvements in the others.

Due to the interactions and influences among the four dimensions, the policies and strategies regarding the performance of these dimensions cannot be developed separately. In order that manufacturing companies conform to the commitments to sustainable development, a reliable measurement system, which allows them to reach an effective performance improvement, is needed.

During the past decade, a number of researchers have developed instrument frameworks to support the assessment of corporate sustainability; however, most of the existing frameworks seem to neglect the importance of quality in business sustainability. Additionally, according to literature, the indicators have been identified in terms of the efforts to quantify them, such as using a ratio, percentage, or cardinal number as the representatives; although many of them are explicitly qualitative in nature. This results in the indicators being unable to envelop the holistic views of those aspects. Moreover, many frameworks interpret 'sustainability assessment' as merely a performance measurement in terms of the triple bottom line. Therefore, they mainly comprise a set of lagging indicators without considering performance drivers that link these indicators to the long-term corporate existence. Also, most of the prior works on the subject have identified a large number of criteria and indicators based on their judgement and experience. To date, it can be claimed that there has been no attempt to synthesise various criteria on the basis of systematic empirical research. Furthermore, there is a lack of attempt to aggregate a large number of indicators without limiting the complexity of the sustainability context, such as the interactions among the indicators.

The first objective of this research is to develop a comprehensive framework of corporate sustainability assessment through an empirical study. The process begins by identifying relevant criteria based on

literature. At this stage, the literature-based criteria and indicators are identified by referring to manufacturing business in general rather than limiting to only a specific industry. Then, the case study approach is employed in order to understand specific concerns of sugar manufacturers regarding their business sustainability. This enables the identification of concrete indicators which are truly practical in the industry. Furthermore, the case study allows the researcher to investigate the relationship and priority among various criteria and indicators based on the practitioners' viewpoints. However, it may be argued that indentifying the indicators from the case studies may lack generalisability and open to personal bias in the interpretation. To overcome these drawbacks, a survey will be carried out to support an argument for generalisation across a wide range of companies within the industry. By combining the findings from case studies, a survey, and the knowledge from academic literature, the proposed framework is more believable as an accurate measure of corporate sustainability. Also, both standardised data and causal understanding can be achieved. Reliable and valid instruments provide an implementable tool for practitioners to self-assess and compare their performance and policies with the competitors.

The second objective is to develop a method of performance assessment through the application of multi-criteria decision analysis (MCDA) techniques and evidential reasoning (ER) approach. The importance of each criterion, or its power in discriminating different companies in terms of their ability to maintain the business in the long run, is analysed by means of both relative importance and its dominance power. The latter one is considered under the assumption that the most important criterion based on the relative weight derived by a certain method may not exactly be the most critical criterion in the real practices, and the actual dominance of each criterion can be higher or lower than its relative weight. The intrinsic power of some criteria might lead to the inconsistency between practical and theoretical result. This is called 'dominance' in this study, and this is the idea that inspires the author to investigate if this is the case in corporate sustainability practices. The ER approach is applied to deal with the complexity and uncertainty of the assessment.

The advantages and applicability of using the proposed framework and method are illustrated by the case studies of sugar manufacturers. The sugar industry is selected as the basis of this research for a number of reasons. Firstly, the sugar industry is cited as one of the industries responsible for substantial impact on the environment and society. As of today, their image has become positive due to the emphasis on sustainable development and corporate social responsibility initiatives and also the pressure from society and legislation. Owing to the great improvement during the past decade, it is expected that an empirical study within the sugar industry could provide some useful practical implications in the context of business sustainability. Another significant reason is that the sugar industry is one of the most important sectors contributing to the economy of the researcher's country, Thailand.

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09.01 Sustainable Energy Systems: Facing the Energy Challenge

CSR as a source of business and process innovation

Case study OMV

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Keywords: CSR; innovation; stakeholder; eco-innovation

CSR is increasingly becoming a part in discussion of competitiveness and the creation of additional value in a great number of companies. CSR is also gaining greater influence on the core processes of an increasing number of companies.
In a CSR driven innovation process companies it is essential that the unique CSR understanding will be combined with the core competences to develop new products, services and processes. This paper focuses on process innovation especially innovation in close interaction with multiple stakeholder groups (opportunities and options of different forms of collaboration in the innovation process between companies and stakeholder).
After discussing the relationship between CSR and innovation there will be presented a case study of OMV. OMV is one of the largest stock listed companies in Austria and an integrated, international oil and gas company. This company has designed an innovation process where the results of the stakeholder interaction (stakeholder dialogue and individual discussion and projects with stakeholders) and the confrontation with highly sensitive topics - mainly ecological and societal topics - influence the direction and the favorite solutions of the innovations.
Examples of the so-called "Eco-Innovation" are for example technologies for the reuse of excess-gas; solutions for the use of geothermal energy and H2 mobility.
Finally there follow a critical conclusion with notes for future research activities.

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Cost-Efficient Steps towards more Sustainable Energy Systems

Behaviour Change in Demand-Side Management and Smart Living

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Keywords: sustainable energy systems; behaviour change; demand-side management; smart living

A new work of the International Energy Agency (IEA) concentrates specifically on energy end user behaviour change. There is a great opportunity for Demand-Side Management (DSM) programmes if this potential (to be as vast as 30% of total energy demand, estimated by Gardner and Stern, 2009) could be easily accessed and directed. However, as many other IEA DSM Tasks have discovered, the 'market failure' of energy efficiency is often due to the vagaries of human behaviour and choice. The best ideas, policies and programmes have been shown to fail again and again in achieving their desired outcomes. The current social norm is still not to see energy saving behaviour as a major priority in achieving a transition to a sustainable energy system.

There are several reasons for these challenges and this new Task sets to uncover, unravel and define them in order to provide clear recommendations to policy-makers and DSM implementers (cf. Abrahamse et al., 2005). One of the main challenges is that humans are often still regarded as economically rational actors whose behaviours can be influenced by fiscal incentives alone. However, the complexities influencing human behaviour are so vast and manifold that such simplistic approaches almost invariably fail. It is imperative to uncover the context-specific factors (from infrastructure, capital constraints, values, attitudes, norms, culture, tradition, climate, geography, education, political system, legislature, etc.) that influence human behaviour in specific sectors (the factors that influence our transport behaviours often differ from the ones driving our hot water usage, for example, cf. Scheuthle et al., 2005).

In addition, there is a large variety of research disciplines that endeavour to study human behaviour (social and environmental psychology, environmental and behavioural economics, anthropology, science technology studies, practice and innovation diffusion theory, etc.), each with their own models and frameworks, advantages and disadvantages. Unfortunately, they usually do not communicate well - not with each other and not with the end users of their research - the policy-makers and DSM programme designers and implementers. This leads to confusion and lack of context-specific programme or policy design that is based on the best behavioural information or models.

Another crucial issue relates to monitoring, understanding, learning about and adapting initiatives in a more systematic manner. There is a real and urgent need for analysis of context factors influencing DSM and for robust and concrete evidence on the contribution of DSM to a more sustainable energy system. First results of the research towards an inventory of contextual factors influencing effectiveness of DSM programmes, identified key approaches of resolution and shared learnings and best practices within the IEA work will be presented in this paper.

Why is there a special need to focus on behavioural change?

Governments struggle with achieving their targets (often set in legislation) towards developing low carbon regions in Europe, i.e. sustainable energy systems. There is now a growing international realisation that technological development (i.e. renewable energy supply) will not be sufficient to meet

those targets. Energy efficiency and energy conservation have gained renewed interest due to climate convention commitments and the rising concerns about prices and security of supply of imported fuels (Allcott & Mullainathan, 2010). They are the cheapest, fastest and most feasible ways to meet climate change mitigation targets (as well as many other environmental objectives). Concern for security of supply and 'peak oil' and other resource shortages have added to the urgency of energy conservation. In addition, supporting research in energy efficiency is contributing to the European objectives in resource efficiency (EC, 2006). Today, energy efficiency is promoted under a variety of headings, including climate change mitigation, sustainability, eco-efficiency or energy self-sufficiency.
Recently, DSM programmes are increasingly acknowledging the untapped potential of changing the patterns of energy consumption by focusing on end-user energy demand reduction through behavioural changes (Emmert et al., 2011; IDEA, 2009; Mourik et al., 2009). The potential of behavioural change (peak-load shifting) is, for example, one of the important elements of the business case for an economically viable roll-out of smart meters and thus contributing to smarter living (Faruqui et al., 2010; Servatius et al., 2012).

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Implementation of the STEEP Model for Studying the Impact of a Photovoltaic System on a Remote Village in Kenya

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Keywords: STEEP model; photovoltaic system; grid lines; social and economic impact

Off-grid renewable energy technologies such as wind energy and solar energy have been increasingly used as sources of energy in the developing world. This is mainly due to their portability and the continuous rapid decrease in their cost. Photovoltaic energy systems are being used to power loads ranging from small shops to whole villages in regions where the electric grid is not available. This paper discusses the social, technological, environmental, economic and political impact of a solar power system on a remote village in Marasabit, Kenya. The STEEP model is used to access the above factors. The methodology employed is a comparison between constructing a solar energy system to power a village vs. extending grid lines to the village. A number of assumptions have been made regarding the village. It is assumed that the village contains 1 primary school, 1 healthcare clinic, 60 houses, 10 shops and is located 200 km away from the nearest distribution power unit. The total population of the village is 300 people. The total power load required is calculated based on the above assumptions. The design of both systems is developed and an economic decision is made based on the cost of the systems. The second step in the analysis involves using the STEEP model in order to study the remaining factors. The United Nations Millennium Development goals are incorporated in studying the social and environmental components of the STEEP model. It is concluded that a solar energy system project would be the best option for the village for a power source given the remoteness of the village.

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The sustainability of nuclear power

Facts and faith

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Keywords: nuclear power performance; nuclear forum; media communication strategy; virtual reality

The supply and use of energy is an important component for the realization of sustainable societies. The 1987 WCED report (chapter 7) considers an efficient and renewable energy economy as a keystone of a sustainable common future. Climate change mitigation has strengthened the case for an urgent and drastic transition from fossil fuels to low or zero carbon energy supplies (IPCC 2011). Renewable energy is the preferred option, but the advocacy for nuclear as "part of the solution" is tedious, with support by several vocal celebrities, for example Sir David King (Oxford University), George Monbiot (the Guardian), James Lovelock (Gaia hypothesis), James Hansen (NASA Goddard Institute).

The lecture addresses three questions. First, what is the performance of nuclear power on the main criteria for assessing the contribution of energy options to sustainable development? Second, is nuclear power a suitable partner in the transition to energy efficiency - renewable energy supplies? Third, what arguments and tactics are employed for continuing and extending acceptance of nuclear power activities and eventually further expansion there-of in Belgium as exemplary case for a number of other Western-European countries?

Nuclear power is evaluated for its performance on the four main dimensions of sustainable development: political (transparency, access to information, participation, democratic decision making); environmental benignity (greenhouse gas emissions, other emissions and environmental impacts, waste toxicity and longevity); social responsibility (improvement of the life conditions of people in a more equitable global society); economic prosperity (contribution to energy security, low-cost energy supplies, affordable pricing). There will be a more extended discussion on the economic significance of nuclear risks and on the aggregation of individual risk assessments for societal decision-making.

The compatibility of nuclear power with the deployment of energy efficiency and renewable energy will not be analyzed in detail, as already done by Verbruggen (2008). Only some of their salient attributes and a few aspects of their past relations will be mentioned, with a more extended consideration of their role in a future of sustainable development.

The emphasis of the lecture is on the apparent paradox of the still high indulgence for nuclear power by large parts of the constituency and by policy makers in developed societies, compared to the rather poor score of that technology on the main criteria of performance in sustainable development. The strategy of the Nuclear Forum as port-parole of the nuclear sector is described and analyzed. The contents of the actual messages, the way of formal communication with the public, the channels of communication, the presumable informal pressures and incentives added to the campaigns, etc. will be illustrated with observations from Belgium. There was an extensive campaign in the years 2008-09 to boost the idea of nuclear renaissance. With the catastrophe of Fukushima the Nuclear Forum became invisible. In January 2012 a new campaign has been started, but of lower profile than the nuclear renaissance one. General lessons about how particular interest groups argue in favor of the own visions and interests are derived from field experience and observation, and submitted for consideration

and discussion with the audience. The findings are valuable in understanding the stalemates and barriers observable on the path to a low carbon energy economy in particular and on the path to a sustainable development in general.

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09.02 Sustainable Energy Systems: Facing the Energy Challenge

Challenges and opportunities for energy planning processes at the municipal level

Lessons learnt from experiences in Southern Switzerland

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Keywords: municipal energy planning; multi-level governnace; multi-stakeholder processes

1. Energy policies at the municipal level

Since the Rio Charter and the launch of Local Agenda 21 processes, there was growing acknowledgement that the local level is the most appropriate to take the lead in action in sustainability and particularly in climate and energy policies, influencing people behavior and lifestyles and implementing smart policies [1, 2, 3, 4, 5, 6, 7, 8, 9, 10].
Taking the cue from three energy planning processes in Southern Switzerland (Ticino Canton), we develop a critical analysis of municipal energy planning processes, identifying key factors of success and barriers affecting the path towards sustainability.

2. Municipal energy planning in Southern Switzerland

In the Ticino Canton by now only six municipalities are engaged in municipal energy planning, under voluntary commitment; since 2009 we supported five of them in the elaboration of their energy plans (inter-municipal energy plan for Agno, Bioggio and Manno and energy plan for Melano and Mendrisio).
Our work builds on existing methodologies for energy planning processes at the local scale [11, 12, 13, 14]. Embracing good governance principles [15], our approach calls municipalities for:
i. accepting that energy planning cannot be restricted to the elaboration of purely technical reports, being instead the result of complex collaborative processes [16];
ii. guaranteeing transparency and seeking for consensus, involving civil society and local stakeholders as early as possible;
iii. providing timely monitoring and assessment of the effectiveness of the plan and being open to re-orient objectives and actions in case monitoring should show undesired or unexpected effects.
Our previous experience shows that points (i) and (ii) are poorly applied in the Ticino Canton. Point (iii) is instead much more popular; however, effective re-orientations of plans based on monitoring results are still uncommon.
From the technical viewpoint, in each planning process we carried out quantitative and GIS-based analyses of the local energy balances and performed detailed identifications of the potential for exploitation of renewable energies and local infrastructures, for energy savings in the end-use sectors

and for the development of district heating networks. This allowed to define general visions and objectives, to outline strategies and to determine sets of actions to fulfill them. Actions we identified ranged from information activities, including opening of local energy centers, to regulations, monetary incentives and exemplary projects on municipal properties.
Visions, objectives, strategies and actions were identified through an interactive approach, based on discussion with the municipal working group charged with the elaboration of the plan. In particular, choices of the strategies of intervention were made during public workshops, applying multi-criteria group decision-making techniques [17].

3. Lessons learnt

Our energy planning processes are the first experiences in the Ticino Canton, thus they will be regarded as reference points for future experiences. Were they really successful and effective? We have no elements, by now, to assess their effects, since implementation has not started yet. However, we can make a preliminary assessment of the planning process as a whole. Lessons learnt can be summarized in a SWOT analysis, which allows to communicate Strengths and Weaknesses, Opportunities and Threats (external factors).

Strengths

i. Involvement of the stakeholders and the civil society, fundamental for consensus building and for the effective implementation of the plan;
ii. creation of spaces for public discussion (workshops), through the definition of alternative strategies, to be evaluated and compared using multi-criteria group decision-making;
iii. quantitative and GIS-based approach, allowing to consider local peculiarities in the definition of objectives, strategies and measures while guaranteeing consistency with higher-level policies.

Weaknesses

i. Cognitive barriers: lack of education and awareness about the future of climate and energy and its consequences on everyday life;
ii. cultural problem: lack of visions, values and ideals capable of stirring people up to action; excessive faith in technologies and energy efficiency improvements;
iii. dominant mistrust: changes in everyday behavior generally regarded as costly and poorly effective;
iv. weak political engagement and fear of introducing changes (existing things are often a priori preferred to what is new and unknown);
v. loss of sense of responsibility, tendency to rely on higher-level institutions.

Opportunities

i. Growing awareness in the public opinion of the importance of local action, also under the nudge of major frequency and intensity of the extreme climate events;
ii. traditional financial weakness of the municipalities may be overcome by third part financing mechanisms - as long as they are strengthened in Switzerland.

Threats

i. Reluctance in applying the subsidiarity principle and governance conflicts between different level institutions: municipal authorities are often deprived of jurisdiction on certain energy issues, which are firmly kept in the hands of higher-level institutions (Cantons, Confederation).

4. Conclusions

Experience gained allows us to identify key factors in the development of successful energy planning processes, besides technical competences: quantitative GIS-based analyses, public participation and availability of alternatives to be assessed and compared, for public discussion and consensus building.
We can also outline main obstacles in the actuation of effective and ambitious energy plans: lack of awareness, mistrust, not-in-my-term-of-office NIMTOF syndrome [18, 19], widespread fear of introducing changes [20], which altogether lead to passively rely on higher-institutions intervention and technological development (energy efficiency), instead of promoting above all energy sufficiency [21] and acknowledging the effectiveness of bottom-up changes in single people lifestyle and behavior [also stressed by 22]. This attitude is also stressed by higher-level institutions (cantonal authorities) tendency to limit municipal jurisdiction on energy issues.
In such a context, our main advice for future processes is to encourage cultural changes, both at local and higher-levels. In particular, work must be done on institutions, so that they acknowledge that in such a complex framework the traditional top-down government approach is no longer appropriate and should be replaced by flexible multi-level and multi-stakeholders governance approaches [see for example 23]. Extensive interactions between the levels would allow full implementation of the subsidiarity principle. Bottom-up social pressure will be a powerful tool to encourage such a change: for this reason, investing in education, information and awareness raising initiatives and triggering them off in energy planning activities will be of vital importance.

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Energy Efficiency Indicators for Ukraine

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Keywords: energy efficiency; energy conservation; sustainable energy use; government energy policy

The objective of the paper is to analyze energy efficiency and potential energy saving in regional aspects. Analysis of energy consumption efficiency at regional level allows to give answer to a question why some regions are more efficient in using energy than others and to set up tasks for each region with regards energy efficiency.

The rating methodology is based on International Energy Agency methodology. It allows separating key factors defining energy consumption: structure of regional economy, economic activity and energy intensity, and to get more precise evaluation of energy efficiency compared to standard evaluations. Energy consumption in the region is divided into final energy consumption in agriculture, mining, 10 sectors of manufacturing, services and residential sector and for each of them energy efficiency indicator is calculated. The average energy consumption in a correspondent EU sector is taken as a reference point.

Energy efficiency for Ukraine in 2008 was 52% of the EU level. Raising of energy efficiency to the EU level allows to cut total final energy consumption in agriculture, industry, services and residential sector by 48%. It is about 27 million tonnes of oil equivalent and amounts to about 34 billion м3 of natural gas or 11.8 billion EUR in 2010 prices. The shares of industry, residential sector, agriculture and services in potential energy saving are estimated at 61.4%, 30.2%, 5.1% and 3.3% respectively.

The difference in energy efficiency between leading regions and the last ones is about 2 times. The rating is lead by Vinnytsia, Chernivtsi and Odesa Oblasts whose energy efficiencies are 71%, 70% and 70% respectively. The least energy efficient regions are Luhansk, Poltava and Dnipropetrovsk regions with 38%, 39% and 43% respectively in comparison with the EU. Such a difference in energy efficiency should be referred to presence of energy inefficient and technically energy intensive sectors of industry and inefficient residential sector.
The biggest potential of energy saving is concentrated in industry. Raising of energy efficiency to EU level will allow saving of about 17 million tonnes of oil equivalent amounting to 7.3 billion EUR. Another important sector for energy saving is residential sector, whose energy saving potential is about two times smaller than in industry. Raising energy efficiency to the EU level will allow saving 8.3 million tonnes of oil equivalent, which is about 38% of total final energy consumption in the sector.

Energy consumption in agriculture and services is much lower than in industry and residential sector. Therefore, there shares in raising energy efficiency are also much lower with the exception of some regions. Raising energy efficiency to the EU level will allow saving 1.4 million tonnes of oil equivalent, which is about 66.7% of total final energy consumption in the sector. Raising energy efficiency in services to the EU level will allow saving 0.9 million tonnes of oil equivalent, which is about 28% of total final energy consumption in the sector.

Regional Energy Autarky

Opportunities, Costs and Ecological Consequences

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Keywords: energy autarky; integrated modeling; land use; biodiversity; bioenergy

Energy autarky is a frequently raised aim of regional development agents, politicians, and other stakeholders in order to foster sustainable development in rural areas. Arguments in favor of regional energy autarky are the generation of added-value and "green jobs", the strengthening of regional identity, the increase of energy security through reduced imports and stabilized energy prices as well as reduced transportation distances, climate change mitigation, and maintenance of marginal agricultural land. Arguments against regional energy autarky are the foregone welfare benefits from trade, regional disruptions in welfare distribution, higher costs for consumers as well as ecological disservices through land use intensification and carbon leakage.

We assess the opportunities, costs and ecological consequences of regional energy autarky in a small rural region of around 21,000 inhabitants in Upper Austria. Regional energy autarky is pursued by increasing production of agricultural and forestry biomass for power and heat production and deploying photovoltaics (PV), ambient heat and solarthermics. We quantify important consequences such as changes on energy costs to consumers, land use intensity, farm gross margin as well as related effects on the abiotic and biotic environment.

Regional biomass supply is determined by a number of factors such as (1) natural production conditions, (2) land use and crop management choices driven by opportunity costs, and (3) marketing choices for agricultural and forestry products driven by market access, subsidies, and prices. In our case study analysis, additional biomass can be provided by increasing land use intensity and replacing current land use by bioenergy crops complying with resource and legal constraints.

We apply a spatially explicit integrated modeling and indicator framework to quantify the effects of energy autarky for different autarky scenarios. The bio-physical process model EPIC (Williams, 1995) is applied to simulate crop yields and environmental outcomes along topographical, soil and climate gradients as well as crop management variants. Simulated crop yields, environmental outcomes, and expert assumptions in cases of unavailable model data are input to a spatially explicit version of the regional land use optimization model PASMA based on Schmid and Sinabell (2007). It is supplemented by detailed regional economic data on production costs and commodity prices, land and capital endowments, crop management variants, and agricultural subsidies. PASMA is applied in a simulation experiment to derive spatially explicit quantity-price relations for biomass in the case study region using incremental price increases for bioenergy crops. Quantity-price relations take account of model endogenous feedbacks such as livestock feeding and nutrient balances and are input to the energy system model BeWhere (Schmidt et al., 2011) to calculate energy production costs of increasing

biomass supply from agriculture. The forestry biomass supply is estimated from historical time series on land cover information and wood production as well as supply elasticities for fuel wood. Potentials for PV and solarthermics are derived from data on solar irradiation, available roof-areas and system efficiencies. Heat demand is estimated by spatially explicit data on the distribution of buildings in the region. Thus, the competition between district-heating and single-dwelling heating can be endogenously assessed by BeWhere, which seeks to find the optimal supply of regional energy resources. Model results are evaluated by a set of indicators including regional energy supply costs, farm gross margin, land use intensity, virtual land transfers through changing input and output flows, and biodiversity effects, i.e. naturalness and vascular plant species diversity (Rüdisser et al., 2012).

The results indicate that a considerable share of energy can be produced regionally from agricultural and forestry resources through land use intensification and crop substitution. The most competitive bioenergy crop is short rotation coppice grown on cropland. Despite a substantial increase in bio-energy crops from agricultural land (from 1300 ha to 3700 ha), overall livestock numbers remain rather stable, which reveals a high comparative advantage of livestock production in the region compared to other land use alternatives. In order to sustain current livestock numbers, three strategies are pursued simultaneously in the model. Firstly, land use is intensified on permanent grassland, secondly, fodder crops such as silage maize or temporary grassland are rather maintained on cropland in comparison to tradeable crops such as grains, and finally, imports of major feed are replacing own production in the baseline. Farm gross margin increases by 0 - 2 % due to higher regional prices for bioenergy crops at the costs of bioenergy consumers. Annual energy costs for consumers increase by up to 266 EUR/capita in a power and heat autarky scenario, while limitation to regional heat supply autarky can be attained at rather low additional costs of 3 EUR/capita. However, monoculture-like short rotation coppice reduces the diversity of the cropland and may also depreciate the visual appearance of the landscape. Intensification of permanent grassland decreases naturalness and plant species diversity. Former self-sufficiency and exports of agricultural products are reduced due to bioenergy production. Maintenance of economically viable livestock production leads to virtual land imports through feed imports. Consequently, regional greenhouse gas emission savings are at least partially antagonized by leakage effects.

To conclude, attaining energy autarky goals leads to higher costs for consumers and reduced regional food and feed production as well as land use intensification in the case study region and leakage effects beyond the region. Therefore, regional development agents and policy makers should support measures that raise energy efficiency as well as utilize by-products in food production and roof areas for PV to sustain comparative advantages in regional renewable energy supply and to reduce unintended regional to international land use effects.

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10.01 Sustainable Supply Chain Management

Identification of environmental and social indicators for the supply chain in the electronics and automotive industry

Contribution within the consortium project* "Sustainability Data Exchange Hub - SustainHub" funded by the European Commission under the 7th Framework Programme

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Keywords: sustainable supply chain management; environmental and social indicators; non-financial KPIs; electronics industry; automotive industry; CSR; corporate social responsibility

General project overview and goals

The project "Sustainability Data Exchange Hub", in short "SustainHub", contributes to improve eco-efficiency and sustainability performance in the global value chain in the electronics and automotive industry. The starting point is the rising demand for more sustainable products and services, provoked by the growing scarcity of specific raw materials and the growing awareness of public opinion and consumers in sustainability issues. These requests are being, at least partly, incorporated into legislation worldwide. Customer driven requirements (e.g. reduction of C02 emission) go beyond the law and are becoming an integral part of companies' policies. For industrial companies from the electronics and automotive sector, eco-efficient products, as part of an efficient sustainability strategy, are decisive to rule future developments on the market. Large OEM (Original Equipment Manufacturer) companies start to internalize this global trend and pass the requirements on to their suppliers. The lack of data and insufficient integration into operational internal processes lead to an insufficient and inefficient fulfilment of these requirements. Therefore, management of sustainability strategies across the supply chain in the electronics and automotive industry was only done rudimentary until now.

SustainHub will combine organisational and institutional measures with technical solutions. The system and the achieved improvement of sustainability performance along the entire life cycle will be evaluate and displayed on the basis of a new innovative product. The combination of the project results will address direct and indirect impacts and will lead to primary effects, e.g. reduction of hazardous substances, and secondary effects, e.g. child labour prevention. SustainHub will not only increase the eco-efficiency of a single product, it will maximise the sustainability performance along the entire supply chain. The expected impact of SustainHub will be remarkably high, es-pecially for SMEs because the developed system will reduce the time and effort of organisational processes for sustainability issues.

Description of the approach and method

A better management of supply chain data and sustainability data will improve the sustainability

performance of product design and production.

The identification of sustainability indicators for relevant environmental and social issues throughout the whole supply chain will allow a periodical feedback on advances and will replace costly and isolated studies. Thus, companies will be able to better manage sustainability issues in the whole supply chain.

In the first stage, environmental and social aspects with particular relevance to the electronics and automotive sector will be identified. Therefore, relevant norms and standards, regulations and laws, conventions, guidelines and frameworks, sustainability indices, eco-labels, papers and scientific studies will be compiled. These items will be studied in detail and assessed against applicable criteria defined by the project team. In addition, selected Sustainability Reports of the electronics and automotive sector will be evaluated for trends in contents and environmental and social indicators (plausibility check). In the next stage, a guideline for qualitative interviews will be prepared and the target group for the survey (Stakeholders) will be identified. The Stakeholders are representatives of the electronics and automotive industry, Trade Unions, NGOs, lawmakers, etc. Based on the results of the qualitative interviews, the quantitative survey will be prepared and conducted. The main result of the quantitative survey is the identification of environmental and social indicators relevant in the supply chain of the electronics and automotive sector.

In next stages, data requirements will be devised and methods for the sustainability data assessment and aggregation will be established. Subsequently, a data model with the ability to handle different types of information will be developed. To support the data collection and to ensure data quality, a wizard - useable as a guideline - will be implemented. Finally, methods for the integration of the results into corporate decision-making and a Code of Conduct for participating companies in the supply chain will be prepared.

*The consortium consists of 14 partners from 6 countries, ranging from component suppliers, universities, NGOs to trade associations.
The project started in February 2012 and is approved for 36 months.

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Managing Climate Mitigation Objectives in Suppliers

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Keywords: supplier management; ESCM; climate change strategy; GHG management

The management and reduction of Greenhouse Gas Emissions (GHGEs) is a critical task for tackling anthropogenic climate change. In the absence of a global climate change regulatory regime, those businesses and public organisations that lead and control supply chains have been highlighted as key actors in instigating the necessary changes. These supply chain leading organisations (SCLO) design products and services, are in close proximity to consumers, and have influence over suppliers (Seuring and Müller, 2008); subsequently, they are in a position of power and control with regards to a substantial portion of GHGEs.

This control and influence also presents a challenge in the form of risk, including its reputational, regulatory and competitive dimensions. This challenge is amplified as many of these risks exist outside their direct control in the supply chain (Kovács, 2008). Although challenging, this situation generates the potential to strengthen and deepen supply chain relationships and improve business performance (Preuss, 2005). Supply chains also present themselves as potential policy conduits, allowing policy to flow through SCLOs to all firms in the supply chain. In order for SCLOs to enact these changes, to minimise the potential risks they face, and open the possibility of new policy mechanisms, they must engage with and manage their suppliers to an unprecedented degree.

The activities that SCLOs are undertaking in order to engage with and manage GHGEs within their suppliers are the core theme of this research. The objectives these organisations are attempting to fulfil, the key variables impacting how and where in the supply chain resources and efforts are focused are investigated, as well as supplier engagement tactics and the capabilities and mechanisms required for successful engagement.

Literature on Environmental Supply Chain Management (ESCM) and Corporate Climate Change Strategies are applicable to this topic. ESCM is a well established area of study and is able to inform the enquiry of specific actions undertaken in order to manage more general environmental risks and issues within the supply chain (Gold et al., 2010; Srivastava, 2007); although deep, this literature lacks specific attention to the management and reduction of gaseous wastes (Seuring and Müller, 2008), such as GHGEs. Previous research on corporate climate change strategies and actions helps to guide this research in terms of the drivers and position of supply chain GHGE management within overall organisational climate change strategy (Kolk and Pinkse, 2004; Kolk and Pinkse, 2005; Weinhofer and Hoffman, 2010), but lacks specificity and depth when it notes the supply chain as an area for strategy development and action.

This project attempts to contribute to both literatures by deepening understanding around how and why SCLOs are managing the firms within their supply chains, including key barriers they face and the factors that are taken into account when making these decisions. Model building also allows theory development and aids in the joining of the two literatures.

The project takes a qualitative stance, utilising in-depth interviews to investigate the research aims, within a UK context. An inductive approach was undertaken so as to allow the specific contexts to be considered and to allow theory development. A scoping study was undertaken involving exploratory interviews with 13 experts from academia, thinks tanks, and business support and consultancy

organisations, which helped to establish parameters and the development of a conceptual base from which to launch subsequent investigations.
The second round of interviews were held with respondents from 19 public and private sector SCLOs, from a range of industries including construction, retailing, utilities, local authorities and national public bodies. These interviews focused on their supplier engagement efforts, the barriers and problems they had faced and the specific strategies and action undertaken and the reasoning's behind these.
Factors such as the base level of capability/ability of the suppliers, size of spend with suppliers, level of influence, and strategic importance of the supplier are all factors that influence which supplier are targeted by GHGE management efforts. The objectives of these actions are split between reporting and scoping aims versus those that seek to reduce GHGEs and obtain direct benefits. Potential benefits accrued included reduced GHGEs, but also increased supply chain resilience and potential reductions in supplier costs. Barriers included internal and external elements, such as a lack of appropriate internal infrastructure and systems for GHGE management and low stakeholder demand, respectively.
A plethora of supplier engagement and management activities were identified, from encouraging suppliers to take part in external training schemes and facilitating supplier to supplier learning, to conducting supplier GHGE assessments, establishing supplier schools, through to funding works that reduced GHGE in suppliers. Activities were also identified that extended beyond tier one suppliers, although these suppliers constituted the main focus of activities. Model and theory development were attempted, outlining the key factors and activities occurring in the supply chain of SCLOs, including the scope and location of such efforts.
These results have several implications. Firstly, as SCLOs have been found to be increasing capacity and understanding within their supply chains, even in the absence of direct policy or regulation, future policy mechanisms could plausibly be designed that utilise this phenomenon to attempt GHGE reductions through supply chains.
Where mandatory supplier engagement strategies are being used, a concern exists regarding the impact these have on SME suppliers who have a poor history with regards to environmental management initiatives and are unlikely to possess the required capabilities to deal with them effectively. Further, a greater understanding and capability may need to be developed within SCLOs in order for current efforts to advance.
This research provides specific real world examples and deepens understanding around how SCLOs are engaging and managing GHGE within their suppliers. This has contributed to literature situated within ESCM discipline concerning supplier environmental management, demonstrating specific techniques and mechanisms available to organisations. This work has also provided links between ESCM literature and that concerning corporate climate change strategy and action. Future research priorities and directions are also provided.

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Change Agent Sensemaking in a Sustainable Farming Supply Chain

From Economic to Innovative Routines

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Keywords: sustainability; sensemaking; supply chain; change agents; embedding; implementation

Introduction

This contribution examines sustainability sensemaking in a sustainable pig farming supply chain, from a change agent perspective over a period of 12 years (2000-2012). We analyze how change agent sensemaking led to embedding corporate sustainability in the supply chain and its long-term trends and effects.
Embedding sustainability takes place and is shaped as much in the organization as in cooperation with other organizations. However, the knowledge of coordinating mechanisms that regulate such processes in supply chains is limited (Nassimbeni 2004). Specifically for assessing and developing transparent chains of sustainable agriculture more research is needed on the new view of embeddedness and the role of change agents (Gond, Palazzo, Basu 2007; Marsden and Smith 2005; Van Baalen et. al 2005).
In previous research the authors of this paper found that embedding sustainability in an organization (intrafirm embedding) requires a contextual process of organizational sensemaking that includes a central role for company change agents (Van der Heijden, Cramer, Driessen 2011 accepted for publication). In this paper we focus on the role of change agents in a supply chain of agrofood companies and their sensemaking initiatives to embed sustainability (interfirm embedding).
Our analysis of the long-term development of the pig farming supply chain will illustrate how companies can form a cooperating chain based on sustainability issues and that such a chain can become a substantial player in shaping the sector's sustainable development.

Methods

The paper employs a longitudinal case study design of the interfirm pigfarming network 'De Hoeve', investigating how the change agents in and around the network initiated and intermediated sustainable change efforts throughout the supply chain. The qualitative methods used include data collection through individual and group interviews, feedback verification and time-ordered data analysis.

Analytical framework and empirical analysis

Based on studies of sensemaking, emergent change and sustainability (e.g. Weick 1995; Balogun, 2005; Hind, 2009) the paper introduces a framework to analyse how change agents in the pig farming network use communication, acting and organisational relationships to influence the sensemaking processes of corporate sustainability in the supply chain.

The empirical analysis focuses on the emergent, unpredictable (and indispensable) aspects of change that have to flow alongside planned implementation efforts in order to achieve successful organisational change for sustainability. The findings show the initiatives taken by change agents, how their efforts evolved, and how they perceived the effectiveness of their efforts.
The longitudinal setting allows us to identify two trends of change agent sensemaking for sustainability: a downward trend followed by an upward trend. We illustrate that the change agent's role was indispensible for De Hoeve to embed sustainability and become a cooperative and transparent supply chain from the farmer to the wholesalers, supermarkets, restaurants and butchers' shops. Additionally, we determine which incentives and interpretations contribute to embedding sustainability in the supply chain.

The research contributes to the study of change agents in supply chain sustainability implementation and draws attention to practical applications of sensemaking theory. As a contribution to practice the findings explain the sensemaking efforts of change agents as well as suggestions and ideas that practitioners can use to guide emergent aspects of implementing sustainability.

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10.02 Sustainable Supply Chain Management

Carbon Performance Improvement Initiative

Climate Protection Program for Supply Chain

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Keywords: supply chain; CO2; carbon emission; reduction; global warming; energy; consumer goods

Retailers acknowledged responsibility for the products they sell and took action by starting a climate protection initative aiming to save several million tonnes of CO2-emissions every year by adressing energy consumption in the supply chain.

We all use consumer goods that are produced all over the world. These are often produced at high environmental and social costs in emerging countries. Critical leverage lies in the supply chain, since a significant amount of CO2 emissions in the life cycle of consumer goods are related to manufacturing. The Carbon Performance Improvement Initative (CPI2) has set itself the goal of reducing these CO2-Emissions by several million tonnes every year.

Eight large Retailers and brand owners (HSE24, KiK, Otto Group, QVC, Hamm-Reno Group, s.Oliver, Tchibo and Tom Tailor), under the umbrella oft the Foreign Trade Association of the German Retail (AVE), have launched CPI2. It is monitored by the German Federal Environment Agency and financially supported by the German investment and development company DEG, through funds from the German Environmental Ministry's (BMU) programme "Climate Partnerships with Business". The BMU supports the program as part of the "International Climate Protection Initiative". Business consultancy Systain Consulting GmbH is undertaking the development work, testing and implementation.

The intitiative has developed a methodology to adress the potential of energy performance improvements along all steps of production. With an easy to use online-tool manufacturers are provided with an instrument, which allows them to independently evaluate the energy being consumed within their businesses. On the basis of this, suppliers will receive tangible recommendations for action on energy efficiency. These range from simple, quick and low cost measures, to complex, medium- to long-term processes. The suppliers themselves can implement simple measures. For longer-term measures, the CPI2 provides support in the form of know-how and technical assistance.

The management-tool, which has been undergoing testing in a pilot phase with 30 suppliers in China, Bangladesh, India, Turkey, Lithuania and Latvia since autumn 2011, has had some success already. For example, a textile manufacturer in China has replaced its old boiler used for steam production in the ironing stations with a modern version. This simple measure alone will save the company 12 tonnes of CO2. Full implementation with suppliers of the founding members of the Initiative is planned for 2012.

CPI2 can be used anywhere in the world and can easily be adjusted to different requirements across

industries. It can also be developed further to adress other environmental issues, e.g. water consumption. The approach is focussed on development and not forced compliance, as well as providing benefits for everyone involved: Manufacturers, Retailers and the Environment.

Manufacturers benefit by:
o Saving energy, which directly related to saving costs
o Receiving guidance and technological know how
o Improved Management
o Improved product quality through use of advanced technology
o Improved working conditions and quality of life

Retailers benefit by:
o Creating transparency about production conditions
o Credible information and communication with customers
o Improved relationship with suppliers
o Being a frontrunner in climate protection and staying ahead of political agenda

The environment, and therefore all of us benefit by:
o Systematic, large scale CO2-Emission reduction
o Overcoming international deadlock situation
o Raised awareness for climate protection
o Improved local conditions

CPI2 is not an auditing system, but aiming at development with clear benefits for those implementing the methodology. It is efficient with a clear focus on systematic CO2-Emission-Reduction. CPI2 will be developed further along with technology advancement.

Cradle to Cradle - an Innovation Path towards a circular economy

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Keywords: resources effectiveness; cycle economy; ecoeffectiveness

Cradle to Cradle® Design implies a paradigm shift in industrial production. The design and innovation process moves from the present linear thinking towards thinking in closed cycles. Materials and processes are chosen and used in a way that the resulting products become "nutrient" at the end of their life. The materials are either reintegrated into biological cycles or remain in technical cycles. Cradle to Cradle® Design does not allow waste and strides to keep resources in endless cycles.

Sample products and projects will demonstrate the concrete application and results of the design process. Design for disassembly and avoidance of problematic substances allows for a new level of quality and safety during production and use and opens new opportunities for material reuse. This can be combined with business models that leave the ownership with the producer. This guarantees take back and maximal reuse of resources. The radical rethinking of design and production can go even beyond towards regenerative design.

Production processes are designed according to the model of nature. No waste, no surrender, no restrictions. The right materials at the right place at the right time, in endless cycles is the key.
The Cradle to Cradle® concept improves the economy in the entire value cycle of a product. Related risks within the supply chain and the production achieve higer transparency. The cost of the economy, the environment and the social aspects become predictable and profitable.
All substances and materials along the entire supply chain are being considered from raw materials to products within the Cradle to Cradle® Design Concept. This results in a product of unmatched quality. Therefore, a continuous raw material use is practiced without restrictions.

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EcoTopTen - the consumer information campaign for energy efficient devices and sustainable consumption

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Keywords: energy efficient appliances; sustainable consumption; best products; communication; dialogue with manufacturers

Environmentally compatible product design and mass market - these two areas seemed incompatible for a long time. And in fact, many ecologically designed products still lead a niche existence today. For over ten years, a comprehensive range of energy-saving and energy-efficient products has been available on the market. However, there is little demand for these products. There are several reasons for this: lack of knowledge regarding energy efficiency labelling, the assumption that the quality of "eco products" will be poorer, and of course, the fact that the price of energy-efficient products is usually higher. Most energy-efficient products are indeed more expensive than the conventional or non-energy-efficient products otherwise available. The difference in price for large household appliances can be as much as EUR200 or more, whereas energy-saving bulbs only cost a few euros more than standard bulbs. However, energy-efficient products consume significantly less energy and therefore cost less to operate, thus compensating for the difference in purchase price. The total costs, calculated as the purchase price and operating costs (also known as "life cycle costs") are therefore usually comparable or indeed cheaper than those of conventional products. The operating costs during the utilisation phase can far exceed the purchase price, and can be 2-3 times higher.
Against this background Öko-Institut initiated in Germany the consumer information campaign EcoTopTen as a major initiative for sustainable consumption and product innovations in mass markets. At regular intervals, the scientists produce recommendations of high-quality 'EcoTopTen products' - all of which offer good value for money and top environmental performance. These recommendations base on specifically developed minimum criteria for EcoTopTen products and are published on www.ecotopten.de, the core element of the campaign. Since 2005, market surveys and buying recommendations for 26 product groups were published and are updated regularly. Besides the internet platform the continuous public relation is a central element of the campaign, crucial for its success. Regular press releases and media partnerships lead to a steady media response as well in print media as well as internet, TV and radio.
Within the market surveys EcoTopTen delivers information on the purchase prices and on further annual costs, such as for electricity or water needed for using the products. In order to allow comparison, typical products on the market that fail to meet the EcoTopTen criteria are also presented. These market overviews should put consumers in a position to take quick decisions in favor of sustainable products. The campaign also provides clues on how to use these products in a way that saves money and reduces negative environmental effects.
Besides the consumers also manufacturers are targeted: a dialogue with manufacturers was initiated on innovation targets and future improvements of their products. The dialogue with different manufactures gives a broad overview on the technological Status Quo and innovations planned or expected to come in the future for the accordant appliances. It reveales also differences between manufacturers and their assortment - some of them being more progressive/innovative and others less. The gathered information in this process together with the framework conditions (e.g. Ecodesign, EU

energy label) and input from other technical experts helps to critically review the EcoTopTen criteria and get an idea of the level of ambition that would make sense - especially from point of view of the range of products on offer in the future.
Since 2009 EcoTopTen is also part of the European initiative Topten that provides information on most efficient products in overall 16 European countries up to now and shows on its website www.topten.eu a European review of Best Available Technologies. In Europe now 16 websites continuously present updated selections of best appliances, recommendations for users and selection criteria. Aim is to make efficient products the normal and best choice for consumers, retailers and manufacturers.
In the current phase from 2012 to 2014 EcoTopTen is financed by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety within the framework of the National climate protection initiative [1] and within the European Intelligent Energy Europe project Euro-Topten Max [2].

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Sustainability Beyond the Corporate Boundaries

The approach of focal company

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Keywords: sustainability; focal company; supply chain; sustainable supply chain management

In today's global and national economies, businesses increasingly rely on the outsourcing of parts of their activities and processes. Companies function and compete thus more and more on a supply chain level, in specific networks with their suppliers and service providers. This outsourcing trend and growing importance of supply chains increases the challenges and has its implications for the corporate sustainability. More and more focal companies are moving to a strategic integrated sustainability policy, starting internally (internal policy, operations and culture) and extending externally into the networks of suppliers and customers, subcontractors and stakeholders. This paper therefore sheds light on the convergence of companies' sustainability and their supply chains and networks. It outlines findings of a literature review, companies 'document analysis and case studies of best practice. The paper attempts to give an overview of how sustainability can be managed and promoted through the supply chain, which drivers and instruments exist for companies to encourage sustainability practices among their suppliers and contractors and what are the success factors and barriers in achieving that.

First, the concept of sustainability in the supply chain is outlined, explaining and framing the terms sustainability, supply chain and sustainable supply chain management, and focal company. The relationships between the different actors in the supply chain, the factors that shape them and their role in promoting sustainability amongst the different supply chain actors are investigated.

Companies have, with regard to their supply chain, different motivations for taking actions in promoting and implementing sustainability among their suppliers and/or reassuring that sustainable products are produced and used throughout the supply chain. Research literature suggests that many of such initiatives have not emerged purely out of market based business considerations or from sustainability and corporate social responsibility (CSR) agendas, but through a process in which such approaches are influenced and shaped by external pressures such as legal demands and demands by stakeholders, consumer groups and other social pressure groups. Last, but not least the top management leadership and the organisational culture play a significant role.

Focal companies apply different strategies and instruments to impose sustainability requirements to their suppliers. These actions are often part of a companies' sustainable supply chain management (SSCM) approach, and focus amongst others on the selection, auditing and monitoring, and training of the concerned suppliers extending the suppliers' engagement to partnerships. The paper provides some specific case studies of focal companies good practice in implementation of sustainability in their supply chains.

There is a lack of research evidence on the effectiveness of the abovementioned instruments, however

some literature indicates that the most successful initiatives comprise a combination of approaches, with commitment strategies and consequent interventions that communicate clear rewards for engaging in environmental and social responsible behaviour.

The conclusions summarise the main findings and most important messages (from both literature review and case studies) with regard to the management and promotion of sustainability within the supply chain networks. It also provides some recommendations on how companies' can improve sustainability practices in the supply chains and indicates needs of further research.

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12.01 Sustainability in Higher Education

Environmental and institutional economics education

A challenge for Education for Sustainable Development

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Keywords: education for sustainable development; economics education; socioscientific issues; resource use dilemmas

1. The environmental and institutional economics challenge

The years 2005-2014 form the "UN Decade of Education for Sustainable Development" (DESD; UNESCO 2006). Halfway through DESD, we reflect on some challenges to higher education with respect to an appropriate incorporation of economics knowledge directly relevant to natural resource use dilemmas.

Do educational systems equip learners with the appropriate cognitive competences to face environmental problems? For one answer, we need to look at the theory of public goods. For many natural resources, it is difficult to exclude someone from its use (non-excludability) while utilisation tends to degrade the resource (subtractability). These resources are open access goods. The appropriation of open access goods is often characterized by an incongruity between resource appropriators and those burdened with the negative impacts of resource use. Individual and collective rationalities collide. Sustainable solutions are unlikely to be forthcoming without changes in the institutional setting of the problem.

Among the priority issues analyzed by institutional economists is the question under which circumstances individuals either tend to safeguard or to degrade natural resources and other public goods. Decision-makers as well as informed citizens need a fundamental understanding of the socio-economic mechanisms and institutional conditions that influence human behavior regarding natural resources (cf. Sadler et al. 2007; Kaminski 1997).

2. Programatic and empirical deficits

Institutional issues such as legitimate access to and control over natural resources are mentioned in key ESD documents such as the official 'International Implementation Scheme' for the DESD (UNESCO 2006). Still, the scheme ignores most of the knowledge crucially important to implement sustainable resource use. Key topics in environmental and institutional economics as addressed in Hardin's

'Tragedy of the Commons' (1968) or Ostrom's analyses of cooperative solutions to natural resource use dilemmas (Ostrom 1990) go unnoticed.

This economics gap in the ESD documents may be symptomatic for deficits in ESD practice. For example, German and Chilean high school students have problems to identify the social and economic dimensions in the wild collection of Boldo (Peumus boldus) and Devil's claw (Harpagophytum procumbens; Menzel & Bögeholz 2009). The same result was found for Turkish students with respect to the exploitation of wild Salep (Orchis mascula; Dervişoğlu 2009).

There is little evidence to suggest that the situation is better in higher education: Agronomy and biology teacher students in Central Sulawesi (Indonesia) did not recognize resource use dilemmas regarding local Rattan (Calamus spp.) collection (Koch et al. accepted). Results from a recent cross-sectional study (Koch et al. 2011) of future Indonesian decision-makers in the field of natural resources (n=882) also show severe knowledge gaps. While there were certain improvements comparing 3rd and 7th semester students for ecological and socio-economic knowledge, improvements in institutional knowledge were lower or absent. Student judgements on potential solutions to natural resource use problems continued to differ widely from expert judgments, and institutional knowledge was negatively correlated with ecological knowledge (Koch et al. 2011).

3. Meeting the challenges in Higher Education

Given the deficits in high-level ESD documents, we regard the fact that current studies point at a pronounced underachievement on socio-economic and institutional knowledge as highly problematic. With respect to specific educational interventions that promote socio-economic and institutional knowledge, the analysis of contextualised case studies on locally relevant resource use dilemmas as well as resource management games (e.g., Fishbanks) should be considered (cf. Kyburz-Graber et al. 2006; Pearson et al. 2005).

Learners bring certain helpful pre-concepts to the discussion of contextualised resource use dilemmas. Only a minimum of training in economics will enable them to fully (i) analyse real-world resource use problems, and (ii) appreciate advanced educational materials produced to foster knowledge on these problems. In this respect, we favor an approach to economics education that is highly learner-centered by reference to student life worlds. Respective teaching materials for economics education should address key topics such as revenue, costs and profit, the role of the state with respect to the economy, price formation as a function of demand and supply, or individual incentives for free riding (cf. Kaminski et al. 2009; Kaminski et al. 2011). Ideally, the successful application of such a framework is based on matching higher education training for teacher students (Universität Oldenburg 2001).

Natural resource use issues should not be construed as a highly specialized "add-on" to fundamental economics education. In fact, the Oldenburg authors of this paper devised a high school concept on introductory economics exclusively using examples from energy economics ("economics with energy"; cf. Malz et al. 2010; Malz et al. 2011). These examples suggest that it is possible to teach much of high school economics using resource use examples. Furthermore this issue "economic with energy" is

integrated in the fundamental higher education training as well. This educational training offers lectures to topics like "globalization and international capital market" and fosters students by different modules e.g. environmental economics (Krol 2010) or introduction into economics: using energy economics as an example (Krol et al. 2008).

Also the evaluation of educational interventions focusing on environmental and institutional economics is starting to take shape. For this purpose, the Göttingen authors of this paper have devised the Göttingen Model for socioscientific decision-making (Eggert & Bögeholz 2006; Eggert & Bögeholz 2010, Bögeholz 2011). Currently, the model consists of the sub dimensions "understanding values", "generating solutions", and "evaluating options". Reflecting the (empirically) confirmed sub dimensions as well as established reliable and valid measuring instruments (e.g. Eggert & Bögeholz 2010), socioscientific decision-making could already be fostered within training studies in school (e.g. Eggert et al. 2010, Gresch et al. 2011).

In our future work, we will bring together the environmental and economics education expertise to face the challenges of ESD regarding socioscientific decision-making. Besides, we conclude that national curriculum planners and international educational institutions may wish to check - and potentially adjust - the contents of conservation-relevant initiatives and programs in education. Otherwise, the second half of the UN Decade of Education for Sustainable Development may pass without equipping learners - and their future teachers with some of the most crucial knowledge needed to use natural resources sustainably.

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Experiences with a Game-oriented Approach to the Knowledge Transfer of Sustainability Indicators in Higher Education

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Keywords: monitoring; sustainable development; indicators; card game; experiences; knowledge transfer

With the decision to adopt several measures contained in the Sustainable Development Strategy (ARE, 2002), the Swiss Federal Council started to implement the constitutional requirement of 'promoting sustainable development'. In order to monitor these changes, the Federal Council asked, amongst other things, for the 'periodic production of sustainability indicators' as one of the strategy measures.
By employing an indicator system to monitor sustainable development in Switzerland (MONET, www.monet.admin.ch), the Swiss Federal Council is seeking to inform the public and decision-makers about the current situation and trends of this process on a regular basis.
Among the statistics and information emerging from the MONET project, much is of general interest to the public as a whole, because they help to engender a positive approach to the future by enhancing peoples' awareness of sustainable development issues.
Playing the Card Game KLARTEXT
This paper presents the experiences with the adoption of a game-oriented approach to the knowledge transfer of sustainability indicators presented in the last International Sustainability Conference (Carabias-Hütter & Ulrich, 2008). With KLARTEXT an innovative and attractive card game was launched four years ago aiming to make the wealth of MONET knowledge accessible in a fun and subject-oriented way. Each of the graphically designed playing cards either corresponds to a MONET indicator, or to one of the predefined goals for sustainable development in Switzerland.
Although the game can be played without the Internet, it is nevertheless used to advantage. In order to make in-depth information (for trainers) and updated data available, a concept-specific web site was developed with 'easy to understand' access to both the card game and the MONET indicator system: www.klartext-monet.bfs.admin.ch.
The game serves to disseminate information and raise awareness within the field of sustainable development. It is suitable for the presentation of relevant sustainability factors in Switzerland in school lessons, further education facilities and leisure time venues. This should encourage a game-oriented exchange within the multi-faceted inter-related subject areas of sustainable development. The game-oriented debate about these areas and their evaluation with regard to sustainable development ought to provoke reflection of ones personal behaviour, with a view to assuming greater responsibility for ones own actions by adopting the necessary key competencies (cf. Barth et al., 2007).
According to Dieleman & Huisingh (2006), playing games is an appropriate activity in the context of learning for Sustainable Development. When one plays games, one simulates and creates realities, with certain mutually accepted rules, roles, conditions and assumptions. The added value of games compared to experiments is the fact that within games, one can combine aspects of comprehension and apprehension, as well as processes of intention and extension.
Within KLARTEXT, the players act as chief editors of an editorial office of a newspaper. Current announcements and events concerning all aspects of sustainable development come together in the

form of playing cards. Using their reporter cards, the players scramble to get the announcements they need for their editorial tasks. In order to write articles, however, the announcements have to match their own particular department, representing one of the various goals of sustainable development. In a succession of game phases, the news are purchased in auctions, news are then traded or pilfered, and finally, articles are written. Furthermore, events influence the course of the game. The developing competition among the players enables a committed participation. All players profit from each other and are able to enlarge their knowledge and experiences horizon.

Uniquely, the card game KLARTEXT combines fun with the dissemination of knowledge about sustainable development in Switzerland. Through the use of references to everyday life, players are skilfully guided towards the facts surrounding the subject of sustainable development in Switzerland. You play the game without much thought, and reach the unexpected conclusion that you have grasped the concept and structure of the MONET indicator system. This game thus combines three elements - sustainable development, learning tool, card game - in a unique way. It links excitement and fun with current information regarding the general level and development in the areas (cf. Luks & Siemer, 2007) of social security and well-being, health and living conditions, housing and land use, culture and leisure, education and science, business and marketing, research and development, production and work, consumption and mobility, waste and soil, air and water, energy and climate, and last but not least, biodiversity and forests in Switzerland.

Gaming strategies provide many advantages for the learner and the teacher such as making learning enjoyable while reducing stress and anxiety, increasing retention, stimulating learners involvement and enhancing overall learning (Anderson, 1998).

Experiences and Outlook

The game was launched in winter 2008 by the publishing house for teaching materials h.e.p. (www.hep-verlag.ch) in Switzerland. Since the game has mainly been played in schools, public administrations, higher education institutions and companies, over 100'000 students and employees in Switzerland came across the MONET sustainability indicators. The game has been awarded as "Activity of the Decade for Education for Sustainable Development of UN and UNESCO 2005-2014" by the Swiss UNESCO Commission.

KLARTEXT is particularly suitable for higher and further education environments, and as such can be used in lessons to tackle the theme of sustainable development in a fun but focussed way. Experiences from using the card game within higher education show, that embedding KLARTEXT within a half-day introduction to sustainable development with preparatory and debriefing sessions seems to be the most appropriate approach. In this way, the chance that students get a deeper understanding of sustainable development is increased, and also the likelihood that their families or other leisure time groups will also get to know the game. That is why on the game's website, the authors present also further playing rules adequate to younger addressees able to use the cards material in other games.

The promising evaluation results of using KLARTEXT over the last four years in higher and further education programmes, justifies now the planning of a French-speaking version and the exploration of introducing this unconventional knowledge transfer also within the business world to cover most parts of Switzerland.

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Method-based Higher Education in Sustainability

The Scenario Method and its Potential in Higher Education

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Keywords: sustainability; future orientation; higher education; scenario method

The objective of this paper is to outline and argue in favor of a method-based approach to higher education on sustainability. We show how this approach has successfully been implemented in interdisciplinary course programs at Darmstadt University of Applied Sciences (DUAS). By this, we also present a best practice example that could serve - besides others - as a paradigm for higher education on sustainability.

The outline of the paper is as follows: The future is central to the idea of sustainability (chapter 1). Sustainability sciences face different possible futures in order to enable a reflection and revision of today's individual and societal actions towards a common future: without considering futures, sustainable development won't be feasible.
The future orientation roots the normative idea of sustainability into our cultural tradition. In classical Greek philosophy, the future was then seen as determined in the cosmic union of nature and mankind. It was only laid open by oracles so that one could accept fate (the Delphi oracle being just one prominent example). This passive observer's role regarding the future changed in the early 17th century: From the Modern Age on, the future has been seen as open for changes. Since the Enlightenment, the idea of 'future' becomes a challenge and a project for man. Modern culture is increasing its pace in the name of progress. From now on, future and power, prognosis and change, planning and action belong together. Sustainable development is part of this cultural tradition in its most radical way, as it tackles the long term future of the whole world in various dimensions.
The consideration of future also forms a fundamental link to education. Future is an orientation point relating to which a subject can reflect itself. Future has to be faced, be it by shaping, accepting or enduring it. To enable subjectivity and freedom, a systematic orientation towards future is necessary. This idea was already formulated in the very beginnings of educational theory. In Emanuel Kant's introduction into pedagogy he argues that ,,Children should not be brought up according to the current, but according to the possibly better future state of mankind, that is: the idea of humanity [...]." Thus, the future orientation links education and the idea of sustainability.

Referring to the future orientation of both, sustainability and education, we analyse a typical approach in sustainability sciences - the scenario method - and its potential for higher education (chapter 2). The scenario method has been used from its beginnings on (e.g. Club of Rome; Meadows et al.) and is still being discussed and adjusted today. A scenario is a quantitative or qualitative description of a possible future state and a possible development leading up to it. The scenarios are described with regard to the relevant aspects of an overarching question to be analysed. Normative and descriptive aspects cannot be separated in this process.
In order to make use of scenario methods in higher education, a didactical reconstruction about what

scenario methods are is indispensible. Insofar as the educational topic "scenario method" is not simply given, it has to be constituted and constructed. Such a "didactical reconstruction" describes the "(Re-)construction of structures from meaning-bearing units. Both deconstruction and reconstruction are being carried out according to normative aspects, the educational goals." (Kircher et al. 2001, 107)

After having argued for the necessity, we perform the didactical (re-)construction explicitly (chapter 3). A differentiation into three ideal types can be made from a didactical perspective, which is supported by cognate methodological differentiations (Grunwald 2010; Steinmüller 1999; Gausemeier et al. 1996).
First, the projective ideal type, which extrapolates from the current state and historical trends. It is a projection of the past into the future. It is therefore based on the assumption, that what happens in future is to some degree preformed by the past. - Second, the explorative-experimental ideal type is used to open up and analyse the spectrum of possible futures. Present decisions and actions are analysed as the main driving force, each opening up different pathway into the future (and closing others). - Third, the teleological ideal type focuses on goals, ends and values. Means and pathways are to be identified according to their potential for reaching these aims. Two forms can be distinguished: back casting and strategic gaming.

Based on this (re-)construction we draw the attention to the potential of the scenario method for education in sustainability - based on concrete teaching experience in this field (chapter 4). We have used the scenario method in a sequence of seminars as part of a broad interdisciplinary education program for the (mostly engineering and science) students of the DUAS.
Students certainly learn how to use the scenario methodology (a central element of sustainability sciences in itself) and to understand the intention, the argumentation, the claims of relevance of a scenario study, they learn to assess and criticise these. But the main potential lies deeper, in the students' ability to analyse, differentiate, use and develop complex descriptions of the future. They learn a systematic approach to tackling the future. In addition, an advantage of the scenario method is that is can be easily related to the students' own life world. The scenario method does not only enable them to analyse distant, scientific questions from a mere spectator's perspective, but can just as well be used to consider one's own life.

We conclude by underlining that the scenario method - based on a systematic didactical reconstruction - is an excellent methodological topic to initiate educational processes regarding a sustainable future (chapter 5). In particular we explicate, besides the future orientation, the normativity that is an essential part of rationality: The use of the scenario method shows how normative decisions have to be made from the first project steps on, and how they influence the possible results to be drawn out of the study. The scenario method carries - like other methods in sustainability science - a rich branch of educational potentials, both for professional training and for general education. These potentials should be used more intensively in higher education.

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Challenges for a Sustainability Strategy of Universities

An Overview of Holistic Concepts and Assessments for Sustainability in Higher Education

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Keywords: sustainable university; higher education; strategy; holistic concept; assessment; indicators

There is a broad consensus at the international level that an implementation of the normative concept of sustainable development is urgent to guarantee the long term ecological, economic and social stability of the global population. However, twenty years after the Earth Summit in Rio de Janeiro where 178 nations agreed to foster the concept of sustainable development the world is still facing various threats like the climate change, loss of biodiversity and increasing inequality. One obstacle preventing significant progress of the implementation of sustainable development in order to meet human needs now and in future is the lack of society's awareness for the interdependencies of ecological, economic and social issues.

This lack of awareness for the importance of sustainable issues can be reduced by education. Therefore the United Nations Decade of Education for Sustainable Development (2005-2014) encourages all levels of the education system to integrate sustainability in formal, non-formal and informal learning. Higher education institutions as an important part of the education system prepare professionals, potential leaders and decision makers who influence society. Hence higher education institutions can play a key role in accelerating the implementation of sustainable development by integrating this concept in their institution and functions.

This paper explores the role of universities for sustainable development as part of the higher education system by analyzing the major functions of universities with regard to sustainability. To assess the level of integration of sustainability in universities it defines important fields of action and selects appropriate indicators for sustainability assessments. Those assessments are important for planning and implementing a sustainability concept for universities. Furthermore this paper gives an overview of the evolution of holistic sustainability concepts and assessment systems for universities. The first steps of the implementation at the University of Kaiserslautern are illustrated and give an example for a holistic approach as described in the paper.

In the last years an increasing number of national and international declarations made an appeal to all higher education institutions to integrate sustainability. But how is sustainability defined in the major functions of higher education institutions and especially for universities?

The traditional role of universities in developed and developing countries consists of three major functions: education, research and services. According to the increasing importance of sustainable development in our global society the role of universities has to be rethought and adapted to the principles of sustainable development.

Integrating sustainability into the main functions of higher education institutions is a huge challenge and requires on the one hand the integration of the three pillars economy, ecology and society and on the other hand a participative transition process adapted to structural and cultural particularities of each national education system.

An increasing number of universities have adopted the concept of sustainability in their business, but the results between the universities differ worldwide. This is caused by the diversity of interpretation of

the concept of sustainability and by the different emphases on its implementation. Sustainability appraisals of the integration progress in universities have to take into account the regional and cultural context of universities as well as the financial and political surrounding conditions. For this reason several assessment systems have been established in different regions. One single standardized and globally valid assessment system does not exist yet. The following four assessment systems for universities have been validated and accepted in their region: Sustainability Tracking Assessment & Rating System (STARS 1.2) in North America, Auditing Instrument for Sustainability in Higher Education (AISHE 2.0) in Europe, Alternative University Appraisal (AUA) in the Asian-Pacific-Region and The Graz Model for Integrative Development (GMID) as a universal assessment tool.

Integration or operationalization of sustainability in universities requires a strategy or a concept. Depending on the different location of universities there are differing requirements regarding the implementation of sustainability. To meet those regional and cultural requirements the resulting sustainability concepts for universities cannot be standardized. Instead individually customized approaches are the key to successful projects.

The progress of the implementation and integration of sustainability in universities can be documented by assessment systems. Documentation, monitoring and controlling are often underestimated and neglected but the benefit usually outweighs the investment of comprehensive and professional concepts. The assessments are important, especially in the early planning phase to determine the current state. The results are used to derive fields of action for the actual implementation phase and to analyze strengths and weaknesses of universities in order to develop appropriate and holistic approaches.

The University of Kaiserslautern is elaborating its concept of sustainability within a research project. Therefor the university's level of integration of sustainability is assessed. The first results are presented in a case study. The findings show that a lot of projects and processes of this institution are already related to sustainable development but further improvements are desirable and achievable.

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12.03 Sustainability in Higher Education

Sustainability reporting in universities

A review of existing tools and instruments and directions for further research

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Keywords: sustainability reporting; higher education; sustainability integration

The pursuit of a sustainable society has received more and more attention during the last decades, due to global problems of population growth, climate change, financial crises, and others the world has been confronted with. This aspiration of achieving a society that creates value on economic, social, and environmental level has inspired many actors of our society to take action. Higher education institutions are among these actors, and they hold a unique position in society, because of their potential to facilitate, promote, and encourage societal response to a diverse array of sustainability challenges facing communities around the world (Stephens, Hernandez, Román, Graham & Scholz, 2008).

Over the years, universities have tried to take up their role within the process of achieving sustainable development, by sharing thoughts and ideas via conferences (e.g., the Halifax Conference on University Action for Sustainable Development in 1991, the Johannesburg Summit in 2002 or the UNESCO World Conference on Education for Sustainable Development in 2009) and the subsequent development and signing of declarations (e.g., Stockholm Declaration, Talloires Declaration, or Ubuntu Declaration), and through individual actions in the field (e.g., development of SD courses, teacher trainings on SD, or "campus greening" initiatives). Despite the diverse array of sustainability integration initiatives undertaken by higher education institutions, it is very difficult for both their internal and external stakeholders to objectively assess the extent to which a university has implemented sustainability integration initiatives within the four major core functions of a university (i.e. education, research, operations and community outreach (Cortese, 2003)).

The definition of appropriate instruments for monitoring, analyzing and controlling the performance of sustainability initiatives and of the institution as a whole (Velazquez et al., 2006) could contribute to resolving some of these problems for university stakeholders. But although some university specific tools for sustainability assessment have been developed over the years (e.g. the Sustainability Tool for Auditing Universities Curricula in Higher Education (STAUNCH) (Lozano, 2010), and the Auditing Instrument for Sustainability in Higher Education (AISHE) by Roorda (2010)), it is generally stated that little research has been done to investigate the current situation of SD integration in higher education institutions (Shriberg, 2002; Desha, Hargroves & Smith, 2009; Ceulemans, De Prins, Cappuyns & De Coninck, 2011).

Universities have also tried to voluntarily report on their efforts of SD integration via sustainability reporting, following the upsurge of this type of reporting in the corporate world (Daub, 2007). A

definition of sustainability reports is given by KPMG (in Daub, 2007) "reports that include quantitative and qualitative information on their financial/economic, social/ethical and environmental performance in a balanced way." Transparent and standardized reporting on sustainability performance could provide a clear view on universities' current state of progress towards sustainability for internal and external stakeholders (Lozano, 2006), clearly increase cross-institutional comparability, in addition to providing managers with new insights and tools for strategic planning of sustainability integration in the organization (Burritt & Schaltegger, 2008).

In this paper, a comprehensive literature review will be provided on the state of research on sustainability reporting in higher education. Besides giving an overview of current reporting tools and initiatives in universities, it will also be thoroughly studied what higher education can learn from the business and non-profit sector within this field. This will lead to some new paths for further research within the broad topic of sustainability integration in higher education.

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Sustainability and environmental ethics

The IBMB-concept of bringing theory and practical cases together

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Keywords: interdisciplinarity; sustainability; team teaching; external experts

Objective

University courses often have high academic standards but lack a reference to the "real world". Students don't get in contact with practical cases. Especially when it comes to environmental ethics, this needs to be changed. Sustainability and environmental ethics bear the opportunity to sensitize future natural scientists to multilayered aspects of environmental problems. Teaching sustainability and environmental ethics is therefore an interdisciplinary challenge that means bringing philosophical ideas and concrete practical local, regional, and global cases together. It means enabling students to take different points of view, identifying conflicts and developing possible solving strategies. This is best done with a combination of diverse teaching methods and an access to the field of environmental problems.

Methods

In our curriculum various teaching methods are combined with empirical content. Firstly, we use team teaching with two members of our institute. Having two people alleviates to advise all students during group work. Secondly, we combine our team teaching with external expertise. For every session, we invite an expert from a concrete field. This expert introduces a sustainability problem to the students in a short talk from about 15 minutes. In connection to this talk, we prepare so called vignettes, cases examples that need to be processed by the students. This is done in small groups in 20 minutes. Students must identify the ethical issues and connected problems on different levels. Their results need to be presented afterwards to the whole class. Finally, those results are reflected by the lecturers and embedded in current scientific discussions. In special cases, excursions are made to give students an empirical introspective in special sustainability issues.

Results

This teaching concept prepares students to identify problems, to communicate with others and to prepare first steps for solving an environmental problem. Due to the changing guest speakers and the field trips, they learn how to communicate with people from different disciplinary backgrounds. They get preparation for later work.

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Fostering Education for Sustainable Development (ESD) through Systems Thinking

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Keywords: systems thinking; education for sustainable development; teacher education

Universities of teacher education face a threefold challenge regarding sustainability: 1) The sustainable development of the institution itself, 2) the incorporation of sustainability topics in teacher education and 3) the development of competencies and skills in order to prepare students to teach education for sustainable development (EDS). This contribution focuses on the latter. The approach of systems thinking presented here is a means that helps teachers but also decision makers such as political leaders and company managers to address sustainability topics in an appropriate manner.

Sustainable development is faced with a series of complex problems that cannot be solved with linear, analytical thinking alone. Systems thinking offers a more holistic, systemic addition to our traditional way of approaching complex issues. Systems thinking does not focus on singular events or elements but opens the view for structuring reality in a systemic way focusing on interdependencies and circular causality as well as dynamic complexity. Therefore systems thinking is counted as one of the main pedagogical principles of EDS (Kyburz-Graber, Nagel, & Odermatt, 2010, Rieckmann, 2010).

Different research groups deal with systems thinking as a core qualification for ESD. The current state of the art indicates that systems thinking contains a whole cluster of competencies and not just one. From earlier studies with classes from 1-9 our research group devised a competence model for systems thinking. On this base we developed the teaching material "Fostering Systems thinking" (Bollmann et al, 2010).

The main components of a competence model of systems thinking (Frischknecht-Tobler, Nagel, & Seybold, 2008, S. 30) can be summarized as follows:
o Systems are mental models of entities, its interacting elements and the resulting interdependencies including feedback loops. A system can be an element of a larger system on its own.
o Systems are subject to dynamics. Stocks may change in non-linear ways, very often even exponentially, and therefore growth is limited. Long chains of effect and feedback loops result in not foreseen delays.
o Sustainable development should exploit the insights of system-models in order to forecast the behaviour of complex systems.
o The final purpose of systems thinking however is to evaluate potential courses of action based on the modelled system structure and the concluded forecasts.

In order to facilitate the modelling process, system thinking relays on a variety of tools, among them causal loop diagrams and behaviour over time graphs (BOTG). Whereas causal loop diagrams depict a snapshot of a system with arrows indicating the relationship between the various elements, BOTGs visualise changes of a given element over time.

The deep involvement with systems thinking concepts and its tools results in a series of essential habits e.g. seeking to understand the big picture or changing perspectives to increase understanding (Waters Foundation, 2012). In the end, these habits are at least as important for sustainable development as the concepts and tools of systems thinking.

Thus, systems thinking can serve to address sustainability issues on all levels of education. Therefore system thinking very often uses hands-on activities in order to let students experience and reflect about complex problems (Sweeney & Meadows, 2010).

The development of teaching materials for classes 1-9 laid the groundwork for the recent study which investigates the implementation of systems thinking in schools. With a standardized training unit teachers have been introduced to systems thinking. The presented study focuses on variables that influence the acceptance and the dissemination of such an innovative approach. The research questions and design will be presented together with the theoretical foundation and preliminary results. We will also give examples of widely used exercises ("systems games") which help students, teachers and decision makers alike experience and reflect about this unfamiliar way of thinking and addressing complex problems.

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Sustainability Transition of BSc-Curricula in Switzerland?

The BSc-IUNR-example

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Keywords: activity of the UN World Decade of Education for Sustainability; education for sustainable development, academic programs; sustainability issues in curricula, the role of universities of applied sciences for sustainable development

Introduction: General political conditions for Sustainability in Higher Education

o The Sustainable Development Strategy 2012-2015 of the Swiss Federal Council contains a series of measures to achieve sustainable development. These measures are structured according to ten key challenges, such as applying education, research and innovation consistently to the implementation of sustainable development principles.
o For both, the «UN World Decade of Education for Sustainable Development» as well as the corresponding action plan 2007 - 2014 of the Swiss Conference of Cantonal Ministers of Education (EDK), the integration of sustainable development principles in all areas of education shall be the main focus.
o All Swiss universities of applied sciences are federally accredited. In addition to reviewing their managerial and organizational structures, sustainability as review topic is assessed as well.

These general political conditions pose a big challenge to the Swiss educational system. The following statements demonstrate how the ZHAW Institute of Natural Resource Sciences faces the challenges of Sustainability Transitions.

BSc in Natural Resource Sciences

The bachelor's program in Natural Resource Sciences at the Zurich University of Applied Sciences prepares students for new professional fields that are being created as a result of the challenges of sustainable development. The focus of this program is on the responsible and sustainable use of natural resources, as well as respect and responsibility for man and the environment. The study program combines scientific subjects with engineering, social and economic disciplines. Five areas of specialization (majors) are available: Organic Agriculture and Horticulture, Landscape-Education-Tourism, Renewable Resources and Renewable Energies, Nature Management and Urban Greening.
The modular design of the study program promotes a semester abroad and the acquisition of additional qualifications (minors: species knowledge, training and consulting). The bachelor's program makes an important contribution to promoting a sustainable society. Therefore, in spring 2010 it has been recognized by the Swiss Commission for UNESCO as an activity of the «UN World Decade of Education for Sustainable Development in Switzerland». This recognition was given for the first time to a bachelor's degree in Switzerland.

Bachelor's program as an activity of the «UN World Decade of Education for Sustainable Development in Switzerland»

In October 2009 a task force received the order to foster and anchor sustainable development in the curriculum and to crosslink modules with regards to contents of sustainability. By means of a systematic review the task force was able to demonstrate and to confirm their hypothesis, that the aspects of sustainable development already played a crucial role in numerous modules of the Bachelor's program. It was found that there are modules which have a close relation to the topic and some that address aspects of sustainable development rather marginally. The following steps therefore aimed at strengthening coordination of contents, at illustrating sustainable development as an integral part of the courses and at supporting the faculty and the lecturers in developing their modules.
This fact convinced the Swiss Commission for UNESCO to award the BSc with the label as a decade activity of education for sustainability. It stated that students acquire skills in order to be able to deal with complex situations, with the dimensions of sustainability and to maintain a careful use of natural resources.

Fostering sustainable development in the curricula

The management, however, didn't stop its efforts and supported the task force to continue the process: On one hand, the task force gives advises via personal coaching and training sessions to those lecturers of the faculty, who want to pick up the issue in their classrooms. On the other hand, those lecturers are supported who are responsible for modules that marginally deal with sustainability. They are encouraged to strengthen references to sustainable development in their courses and to deeply treat the dimensions of sustainability. To facilitate the process the task force compiled a set of criteria that indicate the references to sustainable development (see Swiss Foundation for Environmental Education, 2009). This excellent tool in the form of a spider diagram eased the persuasion of lecturers to cooperate and shall be presented at the conference.

Perspectives

The further implementation of sustainable development into more courses and modules of the Bachelor's degree is the stated goal of the task force in order to display the responsibility towards people and the environment holistically in the curricula. Quality management as well as strategy building processes and further education of lecturers and research assosiates will help the ZHAW Institute of Natural Resource Sciences to continue the sustainability transition, a process which is not as easy as it might seem.
As a result new areas of future-oriented profession arise, which can be prepared by the bachelor's program in Natural Resource Sciences.

Task force

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13.01 Sustainability Communication & Reporting

Sustainability Reporting: have we got the right mix of theory and practicality for local actors?

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Keywords: sustainability reporting; stakeholders; local government; regional

Many local government or regional plans have 'a sustainable future' as a goal or vision for their communities. Yet few local governments or regions have any mechanisms in place to report on or understand how sustainable their community is, despite the myriad of sustainability indicators, indices and frameworks available in the literature. There are a range of reasons this is so, from no agreed process to report on sustainability, lack of capacity of local staff, complexity of some indices, lack of locally relevant indicators, and the lack of easily accessible local data. A recent study of 31 sustainability reporting projects revealed that the most commonly adopted sustainability reporting framework was a simple indicator-based framework that involved local actors in choosing the indicators to ensure local relevance (Byrne et al., 2010a).

In South West Victoria, Australia, An Index of Regional Sustainability (AIRS) was developed to report on the sustainability of the region. Indicators were developed through stakeholder input to ensure locally relevant indicators were included. Then they were combined using a multi-criteria analysis with weightings developed using statistical processes including Analytical Hierarchy Process to produce an index of sustainability. Four years after development and dissemination to local stakeholders AIRS was still not adopted by any local organisations. An evaluation of AIRS found reasons for this included the scale used for reporting and the lack of guidelines for use.

Thus, we produced Getting Started: A guide for developing a regional sustainability indicators in Victoria, based on the review of the sustainability reporting projects, to help guide local governments and regions to develop their own sustainability reporting mechanism (Byrne et al., 2010b). This guide advocates the input of local actors at a number of points in the development of the sustainability report, from agreeing on a framework, to indicators, and reporting methods. Six councils, the local water authority and catchment management authority then partnered with a local university to develop The Great South West Community Report Card. This is the first regional framework for sustainability reporting developed using Getting Started as its basis.

The development of the Community Report Card involved local actors deciding on the framework for the indicators, including sustainability vision, sustainability model, key issues to be addressed and scale of reporting. Then through workshops and surveys the local community and stakeholders were invited to provide their input into the list of indicators to be included in the report card. The report card was then drafted with input again from local actors on the look, analysis and information contained in the report card and associated technical report. The process used to develop the report card was designed to

build capacity and understanding amongst local actors of how to develop sustainability reporting, and what it can be used for.

During the development of the Community Report Card, local actors expressed their need for a sustainability report that provided information on indicator performance to direct policy and programs in their community, rather than a multi-criteria analysis based index of sustainability. Thus, the indicator set is presented in the report card based on a ranking scale, where each local government area in the region is ranked based on relative indicator performance in both a report card format and a more detailed technical report. Protocols for use have also been developed to enable the easy adoption of the Report Card by the local councils and the Regional Planning group.

Thus, a locally relevant sustainability reporting tool and general framework has been developed that is theoretically sound - based on current sustainability theory - that matches the needs and capacity of local actors. The process of developing the report card, and its subsequent adoption by local managers, has increased their capacity to understand and use sustainability reporting. As this capacity continues to increase as they use sustainability reporting in their work, there may be a need to further develop the Community Report Card to include a multi-criteria analysis based sustainability index. But until the capacity of local and regional managers to use sustainability reporting increases, simple indicator-based report cards developed using local actor input provide the information managers want to guide policy and programs.

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Analyzing investor-specific sustainability reporting

Social and environmental risk communication

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Keywords: sustainability; corporate social responsibility; corporate communication; stakeholders; corporate social reporting; investor relations; risk management

Sustainability and Corporate Social Responsibility (CSR) communication has gained momentum in the last decade in the corporate world, mainly due to constantly changing society expectations and pressure associated with NGOs and the media, to which companies feel obliged to respond. Corporate social reporting is one of the most important channels of sustainability communication and serves as a means to inform the public and relevant stakeholders, like e.g. investors, about the economic, social and environmental business conduct of firms (Freeman et al., 2010). Investors are generally considered to be primary stakeholders, i.e. belonging to the most important groups a company should address (besides communities, customers, employees and suppliers; ibid.). They are also termed as "stakeholders with whom communication is inevitable" (Podnar and Jančič, 2006). The study for the first time analyzes the contents of sustainability reports regarding their investor-specific relevance benchmarked by the Sarasin Sustainability rating. The purpose of this paper is to deepen the understanding of non-financial reporting practices towards the stakeholder group investors.

Financiers explicitly seek risk minimization in their asset management which is why sustainability ratings such as the Sarasin Sustainability Rating of the Sarasin Bank explicitly include different company- and industry-specific risk evaluations. The industry-specific risk is composed of social as well as environmental evaluations. By using the approach of the Sarasin Bank the goal of this study is to determine in how far sustainability reports of firms in the banking & insurance and the chemicals industry in Switzerland and Germany actually address the sector-specific risks encountered by the companies. Emphasis is thus placed on the differences in reporting from industry to industry (as also observed by Sweeney and Coughlan, 2008; Simpson and Kohers, 2002; Mitnick, 2000) and on cross-national patterns. Quantitative content analysis was applied to 437 articles of sustainability reports from the chemicals and banking & insurance industry of twenty Swiss and German firms listed on the national stock exchanges.

The analysis shows that more than half of the content in sustainability reports is irrelevant to investors. The chemicals industry's sustainability reports meet the benchmark provided by Sarasin Bank, whereas the firms in the banking & insurance industry do not. Swiss chemicals producers perform well in reporting on their specific industry risks, while German companies mirror the sector-specific risks in the banking & insurance industry. These results indicate that sustainability reporting is handled differently from country to country, and from industry to industry, all in all lacking the amount of accuracy and relevance required by investors.

Accuracy and comparability of social and environmental information however is indispensable to investors when taking social responsible investment decisions. The study therefore contributes to the evaluation of sustainability reporting in two main European economies and presents valuable insights in the investor-specific sustainability communication practices of corporations. The paper ends with an outlook on upcoming questions in the light of evaluating and comparing sustainability reports by

discussing the pros and cons of mainstreaming and formal standardization of sustainability reporting.

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Is an ideal CSR Communication possible?

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Keywords: CSR communication; ad; advertorial; experiment

To credibly communicate CSR is rather complex than easy. Companies and agencies should consider the fit between for-profit- and non-profit-organisations as well as credibility of the medium when communicating CSR activities to consumers.

In the 1970s, the economist Milton Friedman argued that the company's only purpose is to maximize returns to its shareholders: "The corporation is not responsible for other stakeholders" (Friedman, 1971, p. 52). In the last five to ten years, the number of companies with socially responsible programmes has increased considerably (Snider et al., 2003). Corporate Social Responsibility (CSR) has become an important topic for economy and research (Klein und Dawar, 2004; Marin und Ruiz, 2007; Melé, 2006). Chahal/Sharma (2006) state that CSR is a firm's obligation and becomes a "license to operate" in many industries (Schmidt und Tropp, 2009). For example, multinational companies like IKEA, Nestlé or the Austrian retailer Spar have invested a lot of time, human resources and money in corporate social responsibility activities.

However, every light has its shadow. Sometimes the concept is used as a "greenwashing tool" and so "misleading consumers regarding the environ¬mental practices of a company or the environmental benefits of a product or service" (Greenpeace as cited in Bazillier und Vauday, 2009). Other researchers criticise the concept of CSR as edentulous without legal obligation (Frankental, 2001) or as a myth because there is no evidence for an altruistic entrepreneur (Fougère und Solitander, 2009). One step further, Crowson (2009) identifies CSR as an opportunity to enter markets abroad, which is the real benefit for multinational companies.

CSR positively affects brand image, corporate reputation, brand preference, purchase intention and word of mouth. The impact of CSR is influenced by a variety of drivers (demographic variables, psychographic variables, etc.). Too little attention has been paid to the source credibility during the CSR communication process. The research question of this study is: Is there an influence of CSR communication on the brand image depending on industry, the perceived fit and credibility of the medium?

This study will review the research conducted on CSR communication and seeks to address the following questions:

1. Is there an influence of the cognitive and emotional fit between a company and a non-profit organization on the success of CSR communication?
2. Which influences do the moderating variables medium, industry and brand have on brand image?

Communication of CSR

CSR activities should be part of a sustainable communication mix. Means of sustainable communication include internal communication, product advertising in the form of advertisements and TV commercials, sponsorship, public relations (from corporate brochures to sustainability reports), direct marketing, crisis communication, as well as advertorials, homepages and articles in consumer-magazines or imprinting a logo or certificate of an aid organisation on the packaging of a product (Balderjahn, 2004; Schweiger und Schrattenecker, 2009).

Surprisingly, negative information is more effective than positive information about CSR (Sen und Bhattacharya, 2001). Therefore, it is more important to avoid negative reporting than to force positive information about CSR (Mayerhofer et al., 2008).

By analysing websites of multinational corporations, Nöhammer (2009) has recently found that some companies are transparent in their communication of CSR and information is easily accessible on the internet, while others have a CSR department, but refuse to communicate their CSR activities. This shows that companies are not sure whether to communicate their CSR activities.

Du et al. (2010) argued that there is a trade-off between the controllability and credibility of CSR communication. However, information from the company is easier to handle and the management can influence the communication directly - unlike non-corporate sources such as blogs. Stakeholders might perceive the company's communication as more self-interested than non-corporate sources of CSR.

Research Gap

A literature review has shown a demand for further studies on CSR and communication (Du et al., 2010; Lafferty, 2007; Walsh et al., 2009) and consumers' perception of CSR (De los Salmones et al., 2005). The question is whether consumers are aware of CSR activities and trust them, and how consumers react to different types of CSR communication.

The central aim of the study is to determine whether the type of communication (advertorial, advertisement) and CSR-Logo (CSR-Partnership between For-Profit-Organisation and Non-Profit-Organisation) have an impact on brand image.

Study

To answer these questions and to close the research gap, a multi-method and multi-stage research project is conducted and will be carried out in different stages.

Phase 1 and 2 are necessary to identify relevant branches, companies and CSR-Partnerships. The first part of the project an online-study was conducted and the second part was based on two focus groups.

In the last phase 3 of multi-method and multi-stage research project face-to-face interviews were

conducted to measure the influence of different sources of communication on the brand image and the acceptance of the brand based on a 2 x (industry: retail/banking) x 2 (company: Hofer/Spar; Raiffeisen/Bank Austria) x 2 (CSR-Partnership: yes/no) x 2 (type of communication: advertisement vs. advertorial) experimental design.

First results will be presented at the conference.

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AFS: Business Strategies for Sustainability - Current Research, Emerging Concepts and Future Challenges

Corporate Social and Environmental Responsibility Practices and Performances in Europe

The Role of Stakeholders and Institutions

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This multilevel study investigated the effect of national institutional environments on the relationship between stakeholder-focused corporate responsibility (CR) practices and financial performance, controlling for firm-level predictors. To test hypotheses, we conducted a survey of 2,230 firms from 15 European countries, representing different institutional contexts in terms of their socialist legacy and societal governance. Hierarchical linear modeling results indicated that these facets of institutional environments exert differential effects on the implementation of CR practices, as well as moderating effects on relationships between the implementation of CR practices and firms' financial performance. This study thereby contributes to a better understanding of the effect of institutional environments on the outcomes of firms' implementation of stakeholder-focused CR practices across countries.

Responding to pressures from national and international institutions, firms increasingly incorporate corporate social and environmental responsibility (CSER) into their corporate strategies (e.g., Arthaud-Day, 2005; Waddock, Bodwell, and Graves, 2002) and report publicly on their CSER performance (e.g., Maignan and Ralston, 2002). Academic theories about the nature of corporate responsibility (CR) practices and their stakeholder focus also have proliferated (e.g., Clarkson, 1995; Godfrey and Hatch, 2007), along with substantial empirical research on the relationship between CSER and firm performance (e.g., Orlitzky, Schmidt, and Rynes, 2003). Yet significant questions remain regarding the stakeholder focus of CR practices implemented by firms and the performance consequences of these practices.

Therefore, we investigate the contextual effect of national institutional environments on the relationship of three stakeholder-focused CR practices with firm financial performance. In this study, we argue that a firm's national institutional environment influences the relative salience of certain stakeholder groups such that it affects which stakeholder-focused CR practices lead to improved financial performance.

Many studies have examined the relationship between firm performance and CR practices. Although meta-analyses (Margolis and Walsh, 2003; Orlitzky, 2011; Orlitzky et al., 2003) have indicated small positive relationships between CSER and financial performance, scholars still argue that further

research is needed to reach any definitive conclusions (e.g., Margolis and Walsh, 2003; Surroca, Tribó, and Waddock, 2010). The results of international CSER studies exhibit even more disparate and inconclusive results (Egri and Ralston, 2008; Husted and Allen, 2006).

Previous empirical research has been limited in several respects. First, studies of CSER and firm performance often use broad, aggregated measures of CSER or a single measure targeted at a specific stakeholder group (Margolis and Walsh, 2003; Orlitzky et al., 2003). Because CSER is a multidimensional construct that encompasses a large and varied range of practices in relation to different stakeholder groups (Carroll, 1979; Waddock and Graves, 1997), various types of CR practices seemingly should be differently motivated and have diverse implications for a firm's financial performance (Brammer and Millington, 2008; Lev, Petrovits, and Radhakrishnan, 2010). Second, previous research has recognized that the relationship between CSER and firm financial performance is likely contingent on contextual factors, such as national institutional environments and industry effects (Brammer and Millington, 2008; Jackson and Apostolakou, 2010; McWilliams and Siegel, 2001; Surroca et al., 2010).

By addressing these limitations, this study contributes to current CSER knowledge in several ways. In particular, it extends international CSER literature by demonstrating that the relationship between CSER and firms' financial performance is contingent on national institutional environments. By showing that national institutional environments affect the relative salience of stakeholder groups, this study also contributes to institutional theory by specifying the mechanisms by which national institutional environments influence the CSER--financial performance relationship for firms. Our study findings also extend instrumental stakeholder theory by demonstrating that stakeholder groups' salience is contingent on a firm's national institutional environment. That is, firm performance in various countries can be enhanced by CR practices that focus on satisfying the claims of different stakeholder groups, depending on national institutional expectations and pressures.

To support these contributions, we conducted a survey of 2,230 firms from 15 European countries representing different institutional contexts in terms of their socialist legacy and societal governance. We asked top executives about the extent to which their firms had implemented CR practices related to three stakeholder groups (investors, community, and the natural environment) and their firms' financial performance. In contrast with the paucity of large-scale cross-country empirical research to date, our study helps clarify country differences with regard to the antecedents and outcomes of CR practices. Furthermore, because firms are nested in national institutional environments, we used hierarchical linear modeling (Raudenbush and Bryk, 2002) to test our hypotheses and simultaneously estimate relationships at firm and country levels. As such, we respond to recent calls for more multilevel studies of the antecedents and consequences of management practices in general (Cheng et al., 2009; Hitt et al., 2007) and CR practices in particular (Aguilera et al., 2007; Furrer et al., 2010).

In the remainder of this article, we begin by defining corporate social and environmental responsibility practices and review literature on the relationship between CSER and firm financial performance. Next, we develop a set of hypotheses about the institutional antecedents and financial outcome of CR practices. After reporting the study methodology and findings, we conclude with a discussion of study findings, limitations, and directions for further research.

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Sustainability performance and business strategies for sustainability

How sustainable is sustainable business management?

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Keywords: corporate sustainability; sustainability performance; strategy

Sustainable Development as defined by the Brundtland commission tackles global environmental and social challenges and aims to provide a conceptual frame to pursue solutions to deal with these challenges (WCED, 1987). In its basic definition Sustainable Development is a normative and ethical concept. Individuals, organizations, regions, states and societies are relevant actors in any kind of sustainability oriented development.
Corporations have to play an important role in the transition of societies towards sustainability (Bansal, 2005). Approaches like corporate environmental management, corporate sustainability, CSR, or sustainability reporting have been developed and implemented to support corporations to manage their sustainability related impacts. However, the outcome of these approaches seems to be limited as we can still observe an unsustainable development globally (Rockström et al. 2009 a/b)). It is limited because it is questionable if sustainability management supports corporations to be more competitive or successful in economic terms - this could be named as performance in a narrow sense. And it is questionable if sustainability management contributes to Sustainable Development in general which would be the performance in a wider sense taking into account impacts on society and environment caused by corporate activities.
A reason for this deficit is a lack of strategic orientation of sustainability related management initiatives (Baumgartner and Korhonen 2010). Therefore strategic perspectives are developed and used to analyse corporate sustainability management in order to improve its strategic relevance, both for business success and for sustainable development.
The firm level concerns the interests, or the utility, of the firm. There are many studies suggesting a positive relation between sustainability orientation and economic performance or competitiveness (Orlitzky et al. (2003), Margolis and Walsh (2003), Bird et al. (2003), Husted and Allen (2007), Salzmann et al. (2005)). Donaldson and Preston (1995) criticizes instrumental business case studies for lacking "hard evidence". Lankoski argues that it can´t be expected that in every case sustainability orientation is connected to economic success (Lankoski, 2007). This leads to the question how we can measure the success of corporate sustainability activities. Kurucz et al. (2008) identified possible benefits in four different areas:
o corporate sustainability to reduce costs and risks
o corporate sustainability to improve competitiveness
o corporate sustainability to improve reputation and legitimacy
o corporate sustainability to create value by seeking win-win outcomes.

This is in line with generic types of corporate sustainability strategies, i.e. introverted, conservative, extroverted or visionary strategies (Baumgartner 2009, Baumgartner and Ebner 2010).
Acording to Garriga and Melé (2004) business success of corporate sustainability can be measured either in a narrow understanding of benefits or a wide understanding of benefits. The narrow

understanding is about increasing pecuniary values; the wider understanding is about improving the competitiveness of the firm, focusing on improving the operational performance and increasing the valuation of firm assets. Associated with the economic effects the social and environmental performances have to be taken into account, for instance reduced emission, resource intensity or reduced working accidents.
Beside the effects on the corporate sustainability performance (including the economic dimension) the effects of sustainability management on society and nature have to be analysed. This can be the impact on "the national economy", on the "political system", on the "civil society", or on the "natural environment". So here the question is if corporate sustainability helps other actors and systems to be more sustainable.
So we can distinguish two facets of corporate sustainability performance: one is directly attributed to existing structures and activities, it focuses mainly on efficiency. This efficiency orientated performance is named first order sustainability performance. The other focuses also on effectiveness, i.e. existing systems are questioned and systemic innovation are taken into account. This type of sustainability performance supports not only the corporation, but also the society to be more sustainable. This effectiveness orientated performance is named second order sustainability performance.
To evaluate sustainability performance from a strategic perspective three dimensions derived from the mainstream of strategic management literature (De Wit and Meyer, 2004) are helpful: strategy content; strategy process and strategy context (Baumgartner and Korhonen 2010):

o Strategy content. This dimension secures that the framework, approach or project in question contributes to sustainability. What are the substance and the added value in light of sustainable development? To substantiate the content the framework for strategic sustainable development is a suitable approach the measure especially the environmental dimension (Robèrt et al, 2002). For the social dimension the ISO 26000 guidance document on social responsibility provides a comprehensive overview.

o Strategy process. Strategy process outlines the way in which the entire strategy of the framework, approach or project in question is formulated and constructed to achieve the intended content and purpose. It is important to include all primary stakeholders, e.g. the managers, the tool developers or designers and the actors who implement the approach in practice. Primary stakeholders should all be aware of the expected outcome of the project and they should have a system understanding/awareness, not only understanding of their own subsystems or isolated system components.

o Strategy context. The dimension of strategy context concerns the perception of the secondary stakeholders. It is also important to acknowledge the overall environment of the work in question that always includes the larger socio-economic environment, i.e. the cultural context, the political context, the regulatory and market context under which the work must be performed.

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The Emergence of Strategies for Sustainability

Integrating sustainability into business strategy

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Becoming active in communities and researching their corporate environmental performance, many companies strive for showing commitment to sustainability behavior. Given the increasing importance and stakeholder pressure, the question how to combine sustainability activities with business practices for both managers and researchers, became a mainstream issue. Besides Elkington's (1997) "traditional" triple-bottom line approach, excellent studies of strategies for sustainability include Werbach (2009), Kramer and Porter (2006), Baumgartner and Ebner (2010), Orsato (2006) or Zadek (2004). However, despite the significant research, knowledge gaps on the underlying dynamics and micro-processes in strategy formation for sustainability persist (Perini & Minoja, 2008). With this paper we would like to contribute to existing research with the following approaches: First, we took a process perspective to analyze corporate activities, which led to the development of corporate sustainable behavior in the past. Thereby we could identify patterns of actions, which represent phases companies pass in the process of strategy formation. Second, we understood a strategy for sustainability as not being apart from business practices. This implies that we did not concentrate on the identification of strategies for sustainability, yet on the process of integrating corporate responsible practices into business strategy. Third, based on Mintzberg and Waters (1985), Jazabkowski (2005) and Rosén (2011) corporate activities at different organizational levels and strategic importance were researched. Thereby internal dynamics can be demonstrated and linked to the question of how an organization makes sense of sustainability.

In seeking to answer our research questions we chose a grounded theory approach since it typically elucidates a process (Hood, 2007, p. 155). The historical development of corporate sustainability of three multinational companies in the electronic and automotive sector were analyzed. Interpretive notes were created for each case, based on a compilation and comparison of the transcript of several interviews with sustainability officers and board level managers and supplementary documentation such as company websites, promotional material, and internal company data records. Comparing these different data sources allowed us to ensure the reliability of the information that was used to develop the interpretive notes (Miller & Crabtree, 1992). The data were subsequently coded by the use of the critical incident technique (Chell, 2004). Using the technique of constant intra- and inter- case study comparison (Dick, 2007, p. 408) we came to our first research results. They were subsequently discussed with an expert to increase research validity (Jonker & Pennink, 2010).
We found that corporate sustainability activities can be classified into three different types: First, they can refer to corporate processes such as production or waste treatments. Examples include environmental management systems (e.g. ISO 14 001) or corporate guidelines covering business ethics. Thereby a company is internally orientated towards sustainability (Baumgartner & Ebner, 2010). Secondly, sustainability related issues are addressed in corporate products through, for example,

eco-efficiency features. In this stage companies slowly orientate themselves to external sustainability. Third a company can develop an end product which helps other companies becoming sustainable, such as software tools for improved "green performance" and "energy consumption control". Selling services and products which help clients to improve their sustainability performance shows external sustainability commitment.

In our analysis of activities for sustainability, we discovered that this classification of sustainability activities is reflected in the phases that companies passed in the development of strategies for sustainability. We could deduct five phases of organizational activities in the process of aligning business and sustainability prospects. They range from sustainability management without clear strategic focus, over the codification of sustainability values, to creating business opportunities through corporate sustainability solutions. As a result sustainability activities were first kept apart from business practices and become gradually included into business strategy. The strategy for sustainability and the business strategy converge over time.

Two leverage effects cause the business strategy and the strategy for sustainability to converge, which are the process of "framing and naming" in contrast to "opportunity creation". The first one refers to the identification and promotion of the contribution of existing business activities to sustainable development. Whereas the latter covers business opportunities based on the change towards a sustainable society. These effects represent Mintzberg's and Waters' (1985) intended and emerging strategies. Given the established relationship and matching interest between business and sustainability, sustainability is addressed by using the core business and core skills of a company. Thereby sustainability activities and business activities become highly interrelated.

With regards to internal dynamics, we illustrate a two-directional flow of sense making and sense giving (Weick, 2001) processes throughout the organizational levels. These processes result in a configuration of intended and emerging strategic elements for sustainability. Thereby emergent strategic elements, which are "named and framed", are communicated bottom- up and intended strategic elements ("opportunity creation") develop through a top-down process (Rosén, 2011).

Our study contributes to existing literature by demonstrating how the business practices and organizational responsible behavior converge over time. The identification of underlying phases of strategy formation creates the basis for a step-by-step model on strategy formation for sustainability. Business concepts for sustainability can be allocated and applied in respective stages in the process of strategy formation. Their impact on sustainable development and their business advantages can be identified which can serve as a helpful managerial tool. Moreover internal organizational learning processes were identified in the process of strategy formation.

Research limitations concentrate on the data set collected. To increase generalisability and validity additional case studies in other sectors need to be conducted. Moreover to better research learning processes such as sense making real-time observations need to be included in the process of data collection. For future research it is also recommended to investigate similarities with processes of strategy formation for other business objectives.

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Strategic CSR and Firm Performance

Organising Alignment

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Keywords: strategic CSR; contingency theory; alignment; qualitative method

From the collective body of research on the CSR - Firm Performance relationship can be concluded that there exists a positive, though modest relationship ranging from 13% to 18% (Orlitzky et al., 2003, Allouche and Laroche, 2005, Margolis et al., 2007). Several researchers suggest that the relationship is moderated by the strategic use of CSR (Husted and De Jesus Salazar, 2006, Halme and Laurila, 2009, Galbreath, 2009) for example by using CSR as a differentiation strategy by adding a public good, by reducing a public bad or by investigating the impact of reacting or pre-empting stakeholder expectations. Lately, interest in strategic fit is rekindled (Yuan et al., 2011, Maxfield, 2008). This study extends contingency theory and investigates the impact of external and internal alignment of CSR practices on firm performance of multinational subsidiaries operating in the developing country context of Malaysia. Data have been collected from seven multinational subsidiaries headquartered in Europe, the US and Canada. Interviews with 39 senior managers responsible for CSR practices in the market place, the workplace, the environment and the community have been used to develop a model that explains the differential impact of internal and external alignment on firm performance.

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AFS: Circumstances of Sustainability

The institutionalisation of sustainability and its transformation into practice - considering preconditions of sustainability as a basis for instrumental rules

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Keywords: sustainable development; theory of sustainability; transformation into practice; instrumental rules; action capacity

Regarding the discourse in the sustainability sciences, the overall goal is to strengthen the institutionalisation of sustainability as a frame for strategic decisions. Institutionalisation in this context points to the regular reification and structuring of actions, whereas an institution consequently represents an abstract classification system based on actions and relations. The central aspect within this institutionalisation process of sustainability is represented by the action capacity of the involved individual as well as collective actors. Action capacity reflects the basis to realize individual or collective actions and thus brings the necessity into focus to facilitate the internal and external resources of these actors on an individual as well as on a societal layer. The fostering and support of the resources can be paraphrased as capacity development or building. Thus, the reinforcement of these resources certainly goes beyond the scope of the mere generation of new (forms) of knowledge or the learning of new competencies. Strengthening the action capacity of actors can be captured as a social learning process, which includes different forms of knowledge generation and a variety of relational aspects.
A common opportunity to operationalize action capacity is to elaborate a set of instrumental rules. The instrumental rules representing the linkage between the theoretical foundation and the practical implementation of a sustainable development and thus have transformative character. This transformation addresses an individual as well as an institutional perspective. First, the consideration of the conditions given by the normative aspects of sustainability, i.e. the individual right to participate, shapes the individual perspective and acting. Second, the transformation concerns an institutional perspective that instructs the development of society and its institutions. It is based on political justice, emphasizing the demand for collective action and governance arrangements. 'Sustainable development cannot be achieved without governance because of its nature: to foster common goals by collective action' (Zeijl-Rozema et al., 2008). It includes economical, technological, etc. parameters of a concrete society and is determined by the description of the nature-society-system what I call here the preconditions respectively the circumstances of sustainability. It is a basic assumption that the 'environment does not exist as a sphere separate from human actions, ambitions, and needs' and the developmental and the environmental crises are apprehended as 'interlocking crises' (WCED, 1987, p. XI resp. 4). This view takes the social and the natural to be two interrelated systems. Hence, instrumental rules are essentially linked to the preconditions of sustainability. This underlines the necessity of descriptive knowledge for the institutionalisation of sustainability. A social learning process, which accompanies the developing and sustaining of the capacity of different authorities, experts or interest groups to negotiate goals of a sustainable development and translate them into practice

(Pahl-Wostl, 2009) has to integrate aspects regarding the dependency on and finiteness of nature. Establishing this point of view makes it obvious that the realisation of a sustainable development depends not only on certain social constraints but also on ecological constraints and that these can undermine the possibility for further realisation.
A further aspect of the transformation is to identify indicators specified by the regarded functional system. From a systematic perspective, functional subsystems such as economy, culture or ecology can be captured. Each of the subsystems of the overarching nature-society-system or subsystem-overlapping themes is characterized by proper codes (values, norms, etc.) entailing varying ways of the institutionalisation of sustainability. These indicators are related to the instrumental rules and should be applied pursuant to the specific theme or subsystem by the stakeholders of the specific fields. These indicators can help to mark goals and key policy initiatives as well as to raise e.g. 'public awareness of actions that can contribute to SD, educating the public about SD, and making transparent the trade-offs and synergies between different SD objectives' (Coelho et al., 2010, p. 211). Both, the elaboration of the instrumental rules as well as of the indicators will be done on the basis of a conceptual approach with a special eye on the subsystem-overlapping theme 'Spatial Development'. The application of the elaborated scheme turns out to be fruitful for the practice and the institutionalisation of sustainability and thus, indicates the necessity to incorporate descriptive knowledge.

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Circumstances of Sustainability

Sustainability between deliberative openness and ecological and societal constraints

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Keywords: theory of sustainability; descriptive knowledge; deliberation; ethic foundation

In order to be practicable a theory of sustainability responding to the question 'what to sustain?' regards both normative as well as descriptive knowledge (cf. Christen/Schmidt 2011). While normative claims declare the aims of sustainable development, descriptive knowledge delineates the circumstances within which these aims ought to be realised. In an open and democratic society as ours the aims are identified and rationalised in discursive processes. Traditionally, these processes are characterised as debates among free and rational participants mutually identifying goals of development (Sen 2009, Anderson 1993). Their outcomes are open and disputable. However, according to the idea of sustainability a lasting implementation and realisation of aims depends on certain natural and societal facts which thus limit the deliberative openness. Specifically, the limitedness and fragility of natural functions as well as the interdependence of societal action and natural constraints but also certain societal functions have to be considered when determining sustainability goals. And this, so my thesis, affects the deliberative process.

Departing from such an understanding of sustainability the question arises how aims of sustainable development are determined in an open process that likewise takes certain limiting facts into account. How has such a process to be structured in order to differentiate between arbitrary goals of development (which might be any deliberately justified goals) and specific goals of sustainable development?

In order to answer this question I will first consider where to theoretically best consider the specific factual information in the process of reflection. Should this kind of knowledge be regarded in the deliberative process of goal-identification or rather in the reflection of how to best implement these goals? This question may be resolved by bearing on the philosophical debate about ideal and non-ideal theories. While theories about ideals (such as justice or welfare or the good life) identify and justify goals in an ideal state (or world), theories of ideals reflect questions about their implementation or the measurement of improvements in the real world (Hamlin/Stemplowska MS). It is assumed that theories about ideals inform theories of ideals, but that the later may additionally include questions about the feasibility of the claims. Theories that reflect questions of feasibility and that thus include factual information about non-ideal states in the world are labelled as non-ideal theories of an ideal. While ideal theories opt to neglect questions of feasibility, non-ideal theories argue that factual constraints should neither be abstracted from nor idealised.

Since a theory of sustainability is implementation-driven - answering not only the question 'what to sustain?' but equally 'how to sustain?' (Christen/Schmidt 2011) - it necessarily reflects factual constraints. Thus, it must be thought of as a non-ideal theory of the ideal of sustainability. Such a theory might be informed by a theory about an ideal, e.g. the ideal that every human being is able to live a decent life (cf. WCED 1987, 41), but it is not to be identified with such a kind of theories.

This result, second, has consequences for the structure of deliberative processes identifying and justifying the aims of sustainable development. In order to count as a contribution to the debate on

sustainability such a process not only has to follow well-accepted rules of ethical discourse (e.g. Ott 2001), but also - and necessarily - the best available factual knowledge about the functionalities of nature, the interdependency of societal action and nature as well as functionalities of societies. This is to say that deliberative debates on the goals of sustainable development are not as open as ethical discourses in general. Indeed, they are framed by specific sustainability-relevant scientific knowledge. Which statements count as rational in such a discourse depends on normative as well as on specific scientific knowledge. Thus, the debates have to be informed both by a theory about an ideal as well as by theories describing relevant aspects of the world in which the ideal ought to be implemented.
Third, this outcome from the reflection of the ethic foundations of sustainability has influences on the legitimacy of our democratic institutions. A democratic society that engages itself to sustainable development not only requires open discourse on what ought to be achieved, but must also rigidly protect the basic rights of all the human beings (or more general: of all the right holders) which are affected from the actions decided upon as well as rigidly consider the systemic consequences of these actions. The inclusion of basic rights which represent the normative knowledge and of the factual knowledge about the systemic consequences delineate the rationality and rationalise the outcomes of democratic decisions. The reason for this can be found in a basic assumption of the idea of sustainability, namely that the right and the possibility to lead a decent life depends on ecological and societal constraints. In a democratic and sustainable society these constraints must be protected as well as the basic rights of all humans which are influenced by its decisions since the constraints directly affect the realisation of the rights.

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Relating the normative foundation and descriptive circumstances of sustainability

Arguing for a normative feedback-loop

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Keywords: sustainable development theory; normative foundation; justice-theories; circumstances of sustainability

Sustainable development (SD) can be understood as a normative developmental theory and is about guiding society in actions today; it is about identifying goals and means to achieve those goals. Following Marius Christen & Stephan Schmidt (2011), I accept that SD theory begins with a specific problem (that human development erodes the basis upon which it depends) and that it is divided into normative and descriptive components. I take this as my starting point and seek to answer the question of how these two components of SD - and their constituent parts - stand in relation to one another. I argue for a normative feedback-loop based upon an embedded hierarchy of normative principles and explanatory facts. The argument runs over four steps.

First, I briefly argue that SD is a normative endeavor and therewith, has a normative foundation that is comprised of normative principles developed in theories of ideals (i.e. values) and theories of institutional design (Hamlin & Stemplowska, 2012) (1) Second, I identify the circumstances of sustainability as a set of explanatory facts acting as constraints on the development of normative goals and principles and, relying on the argument for legitimate constraints (Mason, 2004), I argue that these circumstances can be interpreted from the normative perspective (2). Third, following the argument for the embedded hierarchy of normative principles and explanatory facts (Cohen, 2003), I argue that the relation between the normative foundation and the descriptive circumstances of sustainability is a recursive relation of influence (3). Finally, following from this relation, I argue that normative principles about ideals and institutional design are both necessary for SD to identify relevant explanatory facts to serve as an information-basis for recommendations for actions taken today (4).

(1) The argument for a normative foundation is based upon the identification of SD as an answer to real-world problem (Christen & Schmidt, 2011). Judging the state of affairs that development erodes the basis upon which it depends as problematic comes from the assumption that such development may undermine the possibility of a good human life for every and the normative investment that every human being is worthy of a good human life and should therefore be afforded one. In light of this, I accept SD as a principally normative endeavor. With this, I turn to normative theories offering guiding principles for how one ought to act: justice theories. These theories are differentiated into theories of ideals (i.e. values) and theories of institutional design (i.e. instantiation of those values in our world), with principles from theories of ideals being invested in theories of institutional design (Hamlin & Stemplowska, 2012). I take this differentiation and argue that principles from both types of theories necessarily comprise the normative foundation of SD.

(2) Turning to the circumstances of sustainability, I take them to be a specific set of explanatory facts

depicting feasibility constraints put forth by the reality of our world. The explanatory fact that the world is both fragile and relatively scarce in its resources is foundational for SD theorizing and must stand in relation to normative theories (i.e. it cannot be abstracted away from when developing normative principles). Normative theories are not void of explanatory facts. There are three sets of explanatory facts taken to be legitimate constraints on normative principles: human nature (at the level of theories of ideals) and institutional design and historical circumstances (at the level of theories of institutional design) (Mason, 2004). Furthermore, the assumption of relative scarcity of resources is a precondition for all justice-theories (Estlund, 2011). With this, I argue that it is possible for justice-theories to invest explanatory facts depicting each of these sets of facts but that the determination of amount and kind of facts must be illuminated through the relation between facts and principles.

(3) To illuminate the relation between principles and facts, I rely on the argument by Cohen (2003): F is a factual claim and in light of believing F, a person affirms principle P. Answering why F is a reason for affirming P, a second (more underlying) principle (P2) will be relied upon - a principle which holds regardless of the truth-value of F and explains why F is a reason for affirming P (ibid. 211f.). The relationship between principles and facts is an embedded one as principles are justified by facts that are grounded in deeper principles giving reason for why those specific facts support the prior principle. It is with this that I argue for a normative feedback-loop where the explanatory facts impact the normative foundation insofar as they are legitimate constraints at the different levels of justice-theories and the normative foundation impacts the value or importance given to certain explanatory facts over others (and not the truth-value).

(4) Lastly, I argue that to inform actions take today, principles from both theories of ideals (deeper principles) and theories of institutional design are necessary - both with their respective explanatory facts as legitimate constraints on the developed principles. The normative foundation of SD requires the investment of explanatory facts depicting our ever-changing world as well as normative principles that are open to change and further development in light of changing explanatory facts. The normative feedback-loop allows for this and thereby, for the identification of relevant explanatory facts for the informing of recommendations for actions taken today.

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Integrating circumstances of sustainability into a formal framework of sustainability without lapsing into a 'theory about everything'

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Keywords: circumstances of sustainability; model of ethical decision making

The contribution examines the implications of a general model of ethical decision making (Dietrich 2008) for conceptualizing sustainability. It relates this decision making model to a formal framework of sustainability that distinguishes a dimension of justice and a dimension of circumstances of sustainability and employs the model for addresses the question what qualifies as an adequate scope of characterization of these circumstances of sustainability.
Dietrich (2008) grounds her model of ethical decision making in the practical Syllogism and distinguishes four elements of ethical decision making, namely perception ('Wahrnehmung'), evaluation ('Bewertung'), judging ('Urteilen') and acting ('Handlung'). Inter alia, she points out that ethical decision making is not only about reviewing and reasoning norms and values, but also about reviewing and reasoning what is covered by perception. Accordingly, she argues that "to reason the descriptive premises necessitates not only knowledge of the lifeworld and philosophical-ethical knowledge, but also multifaceted knowledge from the natural and social sciences "(Dietrich 2008: 73, translation: LVK) Furthermore, Dietrich conceives of perception and evaluation as interrelated: "A fact or a situation is perceived as ethically relevant before the background of certain norms or values; norms or values are perceived as pertinent because a certain fact or situation is taken as given." (Dietrich 2009: 230-231, translation: LVK)
In a first step, the paper relates these ideas to the proposal by Christen and Schmidt (2011) according to which a formal framework for conceptions of sustainability needs to address two dimensions: Christen and Schmidt base their formal framework on the Brundtland-Report (WCED 1987) arguing that sustainability basically asks how the quality of life of today's poor can be improved without undermining the possibility of realizing a decent quality of life later on. Accordingly, they argue that a conception of sustainability encompasses a normative dimension that deals with the aims of development namely, a decent life for every human being and a dimension that addresses the circumstances within which these aims ought to be realized. The paper demonstrates in how far this distinction of two dimensions fits onto Dietrich's differentiation of evaluation and perception. Furthermore it discusses the relevance of Dietrich's focus on the interrelatedness of perception and evaluation in regard to conceptions of sustainability and especially in regard to the circumstances of sustainability.
In a second step the paper addresses the scope of an adequate characterization of the circumstances of sustainability. While it is possible to identify certain 'building blocks' that any conception of sustainability needs to be able to fill, reasoning specific substantial contents of this dimension is principally an infinite task. However, for logical reasons widening the extension of a concept diminishes its meaning (intension). Thus one argument against integrating the dimension of circumstances of sustainability into a formal framework points out that this amounts to transforming sustainability into a 'theory about everything'. (cf.Ott 2008: 110) In answering this objection the paper once again turns to Dietrich's decision making model. Dietrich (2008: 76-77) argues that if the proposed model of ethical decision making is theoretically sound, it implicates that ethical decision making is principally geared not only towards action guidance but also towards increasing reflexivity. Therefore it is principally

demanding and more or less undetermined. Ethics as critique of decision making should aim to make implicit premises explicit and reason them as extensive as possible. However, for logical reasons such reasoning can never come to a definite end. It is therefore necessary to work out additional criteria that define the degree of uncertainty that is ethically justifiable. She therefore argues that working out these criteria is in itself a normative task. I propose that this claim can be conferred to the question if and to what degree a conception of sustainability needs to fill the different building blocks so as to achieve an adequate equilibrium between reflexivity and action guiding potential. The accusation of 'a theory about everything' amounts to claiming that reasoning all the building blocks leans too far in the direction of reflexivity. For this criticism I have two answers. First I hold that a complex concept as proposed in this paper helps to locate differences that stipulate different positions regarding both conceptions of sustainability as well as concrete sustainability questions ('Handlungsfragen'). Such location ('Verortung') constitutes a valuable first step in solving such controversies.
Second presenting a framework as the one given in this paper does not equate to claiming that every claim for a certain action and every answer to a certain sustainability question needs to explicitly relate to all the outlined building blocks. The extent to which the content of certain building blocks is made explicit has to be measured against the kind of question that is asked. Therefore, different kinds of sustainability questions ('Handlungsfragen') may lead to a (closer) focus on different building blocks. However, if conflicts between different proposed answers or solutions occur, proponents of these answers would do well to be able to make their implicit premises explicit and thus to locate the source of conflict. I therefore propose that the framework as given in this paper constitutes an answer to the sustainability problem that represents an adequate extent of reasoning ('Begründungstiefe').

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AFS: Implementing Sustainability in Institutions of Higher Education

Implementing Sustainability in Institutions of Higher Education - Practical Approaches and Challenges to Educating and Learning

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Keywords: sustainability education; learning; curricula; students; practice; university; higher education

"Education is the most powerful weapon you can use to change the world." Nelson Mandela.

The first international document to identify education as an essential tool for achieving sustainable development was Agenda 21, a blueprint for action (on global, national, and local levels) to promote global sustainable development. Ten years later, the United Nations proclaimed the UN Decade of Education for Sustainable Development for the years 2005 to 2014, acknowledging education as a motor of change.

As centers of creation and transfer of knowledge, universities have an influential role within society and its development. With their functions as role models and as multipliers, universities are potential ,,change agents" or catalysts for societal transformation. An increasing number of institutions of higher education such as universities and universities of applied sciences are becoming active in addressing sustainability issues, implementing it across many fields of the organization such as the curriculum, research, outreach and operations.

The focus of this session will be on education and learning for sustainability. The literature depicts a vast variety of competencies that students need in order to be equipped for the handling of the complexity of challenges human society faces today. These are competencies related to knowledge and skills, but also competencies related to values, ethics and emotions, as well as systems thinking. Institutions of higher education, among others, are challenged to translate this mandate into practice. Concrete actions have to be taken:

o to integrate sustainability into the curricula
o to support teachers in integrating topics of sustainability in their courses
o to reach, inform and involve students (and staff) of all faculties in order to foster an understanding of sustainable development and promote active engagement
o to create informal and non-formal settings to promote education for sustainability;

The approaches chosen to address the above topics are diverse and dependent upon the particular setting of the institution. In this practice-oriented session, case studies will be presented that demonstrate concrete actions taken by institutions of higher education. Furthermore, session members will reflect on experiences and challenges encountered when implementing these actions.

Prof. Dr. Georg Müller-Christ, Professor for Sustainable Management at the University of Bremen, will address the question of whether integration of ESD can be seen as a normal organizational development process. For discussion, he posits six different ways to influence the internal negotiating process for more sustainability in teaching affairs.

Prof. Dr. Thomas Dyllick, Professor for Sustainability Management and University Delegate for Responsibility and Sustainability, presents the decentralized bottom-up development process that the University of St. Gallen has chosen for the integration of ESD. Approaches range from contextual studies that complement the core programs and account for 25% of each program of study up to the yearly Freshman Week for entering students; this year arranged around the theme «Sustainable Development Strategies».

Dr. Katrin Muff, Dean of the Business School Lausanne (BSL), will talk about the experiences of BSL, with the current restructuring of the entire Bachelor in Business Administration degree program to embed sustainability and responsibility across the entire program, by integrating sustainability into the expected learning outcomes of each course. She will share the first evaluation of the challenges and opportunities of this fundamental change.

Dr. Christine Bratrich, Director of ETH Sustainability, will present three initiatives of the ETH Zürich on how to approach education and learning for sustainability: The project «ETH Sustainability curriculum» that aims at creating an overview of relevant lectures, courses and programs at ETH Zurich, the «ETH Sustainability summer school program» that provides young researchers the opportunity to work on sustainability-related topics in interdisciplinary and intercultural teams and the project platform «seed sustainability» that coordinates and promotes collaboration between students and external partners on sustainability relates topics.

Dario Pirovino, President of the student association oikos St.Gallen explores how a student initiative can serve as a platform for students who want to engage actively in the area of sustainability. The various projects give an impression of how oikos engages in fostering the topic of sustainability at the University of St. Gallen, whereof one newly pursued strategic approach is to integrate sustainability issues into the existing core courses.

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Educating «Change Agents for Sustainability»

Three initiatives of ETH Zurich

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Keywords: sustainability; higher education; change agents; ETH Sustainability

ETH Zurich's mission is to impart students the best scientific knowledge and practical skills. The university seeks to enable young people to find their orientation in a complex and rapidly changing world. It also aims to stimulate an understanding of ethical and cultural values so that, upon completing their studies, students will be not only highly qualified professionals but also responsible leaders in society. To address global future challenges, ETH Zurich is developing educational initiatives for «change agents for sustainability». Supported by «ETH Sustainability», the central hub for coordinating sustainability activities at ETH Zurich, the curriculum has been supplemented with several teaching initiatives. These projects provide students and young researchers with the opportunity to work on sustainability-related topics in interdisciplinary and intercultural teams. Three selected initiatives will be presented during the workshop:

a) The project «ETH sustainability curriculum»

b) The interdisciplinary and intercultural «ETH sustainability summer school»

c) The project platform «seed sustainability»

The project «ETH sustainability curriculum» aims to create an overview of relevant lectures, courses and programs at ETH Zurich that support the education of future change agents for sustainability. The overview as aims to work as a tool to further develop sustainability teaching at ETH Zurich and to help students to find lectures, seminars or tutorials of particular interest. Courses will be selected according to three different sets of criteria: First, the thematic focal area «sustainable worlds» - defined by ETH Zurich's strategy 2012-2016- sets the scope for a pre-selection. Second, criteria focusing particularly on transformation skills will help to select education programs fostering project management skills, communication skills, or the ability to work in interdisciplinary teams. Third, information about learning objectives, will help to distinguish between lectures that concentrate a) on understanding knowledge, b) on applying existing scientific information, or c) on enabling students to innovate new knowledge. Key elements of sustainable education cited in the relevant literature serve as basis for the definition of the above mentioned selection criteria.

The three-week «ETH Sustainability summer school» program applies the conceptual framework of the project «ETH Sustainability curriculum». Focus is given not only on teaching theoretical knowledge but also on solving specific case studies. The summer school is divided into a teaching block where students meet and discuss with experts from various fields and the case study block. During a first week, students receive an introduction to all relevant topics of a thematic focus. This occurs through a

series of lectures and workshops conducted by both local and international experts as well as inputs speeches by sustainability pioneers. During weeks two and three, students will be split into smaller thematic groups to carry out a guided case study, and to gain further input through lectures, workshops and excursions. At the last day of the course, students present the outcome of their case studies in an interactive presentation. A major outcome of the «ETH Sustainability summer school program» relates to capacity building and skill development of the students from different institutions and countries. Further, students and corporate partner benefit from a close and intensive collaboration during the three-week training program. The thematic content of the «ETH Sustainability summer school» program supports the thematic focal areas of ETH Zurich's overall strategy. Examples from Ethiopia (on sustainable urban housing) and Switzerland (on sustainable resource management) will be provided during the session.

The project platform «seed sustainability» coordinates and promotes sustainability by fostering collaboration between students and external partners. Problems in need of solutions are delivered by external partners from business or industry, local government and NGOs. They are investigated by teams of students from various disciplines. With project-related sustainability research, consulting services and coaching, «seed sustainability» enables students to get actively involved in sustainable development and partnering activities with society, industry and science. Studies within «seed sustainability» are completed in the form of Bachelor and Master theses. The mechanism that drives «seed sustainability» is straightforward but not simple: A typical «seed sustainability» program starts when a question is raised by the world of business, local government or some other group in society. The project is then evaluated by «seed sustainability» and subsequently publicised as a subject for a Bachelor or Master thesis. The team of «seed sustainability» identifies students and supervisors from various faculties with the qualifications required for the project. Furthermore, «seed sustainability» defines clear goals and time frames, coordinates the work between students, supervisors and partners and provides advice whenever needed. Milestone meetings attended by all parties involved are an opportunity to monitor interim results and ensure their integration. In a synthesis document, students and supervisors summarise their research findings in a final presentation so that the results are principally ready for practical implementation. With this approach, ETH Sustainability's project platform, «seed sustainability» acts as link between research-related questions from business and society in general with the research interests of ETH Zürich. «Seed sustainability» encourages students to act as sustainable change agents already during their studies.

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Sustainability related course offerings in the University of St. Gallen Curriculum

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Keywords: contextual studies program; elective courses; mandatory courses

Since the implementation of the new Bologna curriculum at the University of St.Gallen in 2001 25% of all study programs are dedicated to Contextual Studies, which complement the core programs in Business Administration, Economics, Law and International Affairs. Contextual Studies are differentiated into three areas: Practical skills, reflective competencies, and cultural competencies. Students can choose from a wide variety of contextual courses in all three areas to put together their individual portfolio of courses. There are many sustainability related courses included in the contextual studies program.

In addition to contextual studies there is a second categorie of sustainability related courses among the electives of the different core programs. Very recent is the development of a Minor in Sustainability Management as part of the Master programme in General Management.

And finally there are a few mandatory courses dealing with sustainability issues, most notably the freshman's week, the first week of studies at the University of St.Gallen.

This mixture of courses reflects a decentralized bottom-up development process in the field of sustainability. The strengths and weeknesses of this process will be discussed as well as the further development plans.

Integrating sustainability across entire business programs

Evaluating the implementation of integrating sustainability across the BSL bachelor in business administration (BBA) program

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Keywords: sustainability; higher education; integration of sustainability

Management educators carry an important responsibility in educating the kinds of leaders who are equipped to embrace current and emerging social, environmental and economic challenges both regionally and globally. The education and development of such globally responsible leaders represents a significant challenge for business schools who traditionally have focused on providing education in a somewhat segmented discipline-based manner. Sustainability, however, cannot be bolt on, but needs to be built in across the curriculum.

At BSL, we have restructured our entire Bachelor in Business Administration degree program and have embedded sustainability and responsibility across the entire program with each course integrating sustainability into the expected learning outcomes. We are currently in the process of implementing this fundamental change and will evaluate the challenges and opportunities of this process by reviewing reports of the faculty who has already re-designed their course modules as well as feedback of students who have already experienced the new modules during their 1st year of studies. We will compare observations from the BBA program with lessons learned from a similar implementation we have conducted at our MBA program in 2009-10. As a result, we will draw initial conclusions of this intermediary review and draft potential recommendations for other management institutions interested in adopting such a strategy.

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Integration of ESD as a quite normal organisational development process?

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After a couple of years trying to integrate ESD in the German higher education systems there is evidence to suggest that there is no difference between other modern challenges and ESD. The main questions of a change management process for more sustainability are:
1. How are the decision-making processes for changing curricula structured at the different institutions?
2. What are the main options to influence these decision making processes?
3. Integration or addition? What are the fastest possibilities to offer ESD to all students of the respective university?
In the talk the following six ways to influence the internal negotiating process for more sustainability in teaching affairs are put up for discussion:

1. Start with additional courses in ESD

Due to the fact that integrating sustainability issues in all core courses of the respective study program is a long term process, it might be a good idea to organize an additional lecture in ESD. The fastest way to offer lectures in ESD is as an elective course, the best way should be to offer a compulsory course. The latter calls for a change in the examination regulations, which could turn out to be very complicated if you do not have enough open-minded colleagues.

2. Gain the support of open-minded people in the institution

All the negotiation processes are much easier, if the respective management bodies, the decision making committees, the deans and the colleagues are all convinced that ESD is the right way for Universities to face up to with their responsibility to a future-oriented development of society. The challenge is not only to convince people but also to foster readiness to deal with the trade-offs ESD causes in the institution.

3. Windows of opportunity

The story of those higher education institutions, who went ahead in integrating ESD, is the story of a window of opportunity. Most of them had to undergo a fundamental restructuring process or a forced profiling process. Hence, choosing sustainability as a profile of the higher education institution needs a sound basis on successful issues in the respective environmental and social sciences. The general window of opportunity for all higher education institutions is the Bologna Process. One of the main requirements of the new European higher education area is to integrate key competencies into the

curricula of all Bachelor programs. ESD is one of these key competencies.

4. External pressure

Organizational change needs external pressure to move the institution. Pressure groups for more sustainability of universities could be the labor market, demanding more key competencies, the students demanding more relevant knowledge for a future-oriented development of society, the German excellence initiative demanding innovative topics as modern profiles or a new university appraisal system using key performance indicators for sustainability.

5. Internal facilitators

One of the main facilitators is supposed to be the declaration we are talking about. This kind of declaration allows people to give more meaning to ESD and therefore to start internal discussions and negotiations about the specific integration process in the respective institution. A real internal facilitator is a mission statement or a sustainability guideline, derived from the declaration and adopted as a result of a broad discussion process in the institution. A very special internal facilitator is the UNESCO-Chair on higher education for sustainable development, but there is only one in Germany and it works very well at the Leuphana University of Lueneburg.

6. Incentives for professional development

Capacity building for ESD needs not only new or additional teaching staff but also a training of the teachers and lecturers. The training program must be embedded in a special set of incentives for the lecturers, so they spend time for developing the teaching content and the didactical competencies regarding to ESD. There is evidence to suggest that much better than material incentives would be more appreciation on the part of the management bodies and colleagues for the lecturers who shape a modern and sustainable curriculum.

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oikos St. Gallen - students for sustainable economics and management

How a student initiative serves as a platform for students actively engaging in sustainability projects

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Keywords: oikos; student organisation; sustainability at the university

oikos is a student association committing to various projects in the field of sustainability. We construe sustainability as a concept, which is relevant not only in environment but also in particular for the economy and society.
In the forthcoming statement, there will be information according to the motto of oikos: "Be informed! Get involved! Make the difference!". In this regard, there will be first some information about the oikos organization as a whole, followed by its vision and mission statement. Second, the projects of oikos St. Gallen are briefly presented to give an impression on what is being done specifically to foster the topic sustainability at the University of St. Gallen extracurricular. Last but not least, there will be an outlook on how we want to try to get more integration of sustainability issues into the curricula of the courses themselves.

1. Get informed!

oikos is a student organization that has been founded in 1987 in St. Gallen. In the oikos perspective, the gap must be closed between sustainability training that innovative businesses seek, and what many business school programmes are still offering. oikos wants students of management and economics to be ready for the sustainability challenge!
"oikos stands at the forefront of a growing momentum towards sustainable development at universities around the world. As a leading reference point for the promotion of sustainability change agents, oikos members from various academic backgrounds inspire students of Management and Economics on a global scale and advance the integration of sustainable development into teaching and research at their faculties."
"Our Mission is to strengthen action competence for sustainable development among tomorrow's decision makers.
To target this objective, we
o increase awareness for sustainability opportunities and challenges focussing on students of management and economics
o foster their ability not only to analyse long-term economic, environmental and social trends, but also implement sustainability driven innovation
o create institutional support for these learning processes through the integration of sustainability issues in research and teaching at the world's faculties for management and economics."

Up to now, the oikos network has grown to now consisting of an oikos Foundation (located in SG), an umbrella organization "oikos International" (in SG) as well as 37 local oikos chapters (as of January

2011) at business universities of 21 countries worldwide.

2. Get involved!

We may ask ourselves right now, what oikos St. Gallen as birthplace of the whole network contributes to sustainability in education and learning. First of all, there should be mentioned that we are very pleased to be having about 160 members, 50 of which are actively involved in projects. This should reflect the fact that there are indeed a lot of students that are interested in the area of sustainability. The projects of oikos St. Gallen shall be presented at this stage shortly to give an impression over some of the various possibilities that are offered to students at the University of St. Gallen by oikos (most important ones highlighted bold):
o Model WTO: The oikos Model WTO provides an opportunity for future decision-makers worldwide to face important global issues in the simulation framework of the WTO ministerial negotiations (since 1999).
o oikos Conference: Ever since its first edition in 1988, the oikos conference has contributed significantly to the understanding and implementation of issues in the field of sustainability. While the first conference launched the "ÖBU", the Swiss network for environmentally managed companies with currently over 400 members, other editions touched upon issues such as the future of money, sustainability & entrepreneurship and sustainable investment.
o oikos Carbon neutral Campus: Analyzing and improving the Carbon Footprint at the University of St. Gallen.
o oikos meets Business: oikos meets business is a workshop series that regularly brings together selected students and responsible companies.
o UnDress: EcoFashion Event taking place at the University of St. Gallen on March 30 2012 for the first time
o oikos & Pizza: The event "oikos and Pizza" is held every two weeks and represents an opportunity to socialize between oikees. There are quests invited to present their organization or projects, while in an informal setting involving eating Pizza, the various topics are discussed in depth.

New project ideas that are to be launched at this very moment (concrete names tbd):
o oikos Sustainable Investment Fund: Finding strategies to invest in listed companies that reflect our own sustainability criteria.
o oikos Venture Capital Consulting: Helping investors screening for interesting start-ups in the area of sustainability. Further, the chosen start-ups could profit from our business and management knowledge by involving us in their company.

3. Make the difference!

Another project group is being established at this very moment to regarding the specific issue on how to integrate more of the sustainability topics into today's curricula of the courses being held. This is of utmost importance since - as in oikos' vision and mission statement o tomorrow's decision leaders should be addressed with sustainability issues at the level of the university already. The big problem of

the extracurricular activities oikos offers is that only those persons are involved who were interested in the first place. However, we see it as the main challenge to seek opportunities to get formerly uninterested and uninformed students to critically reflect upon sustainability in economics and management.

Therefore, oikos St. Gallen wants to launch a new project with a the name oikos academia. Its whole purpose will be answering some of the following questions:

o What sustainability issues do we - as students - really want and need being discussed in our courses? Which courses in?

o What can be successful learning experiences (action learning etc.)?

o How can we play a role in successfully playing a role as innovators for sustainability learning (strategies to convince professors and the President's Board)?

o How can we bring this issue to the agenda of the President's Board?

I hope to being able to present the first conclusions arising from this project in the end of august at the panel discussion in Basel.

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AFS: Sustainability of Payments for Ecosystem Service

Payments for Ecosystem Services and Sustainability - A Necessary Debate

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Keywords: payments for ecosystem services; ecosystem services; sustainable development; policy objectives and instruments

Market environmentalism has gained popularity among environmental policy-makers in the recent past. One reason is that the concept of ecosystem services that has gained ground in the policy discourse in the past years and that is frequently linked to the use of market mechanisms, seems to balance the quarrels of ecologists and economists. Originally developed as a pedagogic device, "ecosystem service" was turned into an economic idea during the 1990s and found its way into the international policy process in the early 2000s. The Millennium Ecosystem Assessment (MA) can be considered as "a critical landmark" (Gomez-Baggethun 2010, p. 2014) in mainstreaming the concept. The study was commissioned by the UN in 2001 and presented at its release in 2005 a systematic overview over of the impacts of global environmental change for biodiversity and ecological processes which both contribute to human well-being. Although fervently criticised for economic misconceptions, the MA stimulated ecosystem service-related as well as economic analyses of global environmental problems and inspired action to maintain the "benefits people obtain from ecosystems" (MA 2005, p. V) as public goods.

Although there is no consensus about the concept, payments for ecosystem services (PES) can be considered as the preferred governance tool of market environmentalists in the realm of biodiversity and ecosystem services. Differences in concept and design of payment schemes can usually be traced back to diverse views on the role governmental authority should play in economy in general and on responsibility for environmental governance in particular. For adherents of the so-called Coasian Theorem, PES are an instrument to stimulate negotiations between private market participants. Designed properly, PES schemes induce beneficiaries of ecosystem services to compensate providers, so that the external effects of markets are internalised (and externality-induced environmental problems are solved). From this perspective, it is the most urgent task of environmental governance institutions to create ecosystem service markets and payment schemes with low to no transaction costs and clearly defined and enforceable property rights for an optimal allocation of resources.

In an alternative approach originally developed by Arthur C. Pigou the state, considered as the central institution of (environmental) governance is designated to levy a tax or to grant a subsidy in order to internalize external effects of markets (Vatn 2010; Hampicke 1996: 40ff). Thus, the Pigouvian proposal stresses the idea of a strong state that has to intervene in market activities by generating PES itself. However, the functioning of this instrument depends largely on a precise monetarisation of damage or benefit that is the target of the tax or subsidy.

Beyond the economic discourse, some environmental and conservation activists raise expectations that PES can provide solutions for a wide range of problems at nature-society interfaces. Furthermore, advocates of PES stress that this approach is "probably the most promising innovation in conservation since Rio 1992" (Wunder 2005: 3). They have instigated case studies and demonstration activities

testing implementation possibilities of PES schemes to promote sustainable development. In the international climate negotiations policy-makers are debating the introduction of an incentive mechanism called "Reduced Emissions for Deforestation and Degradation" (REDD+) to avoid deforestation and forest degradation which is to secure the ecosystem service of carbon sequestration/ climate regulation while hopefully also inducing biodiversity and livelihood co-benefits in developing countries.
However, other scholars are critical of the PES-language because they see in it a merely instrumental view, which paves the path towards the commodification of nature.
The high expectations, the conflicting evaluations and the increasing employment of PES schemes point to the necessity for an in-depth debate of this environmental governance instrument from the perspective of sustainability. To what extent are expectations in PES schemes justified? Can PES contribute to creating sustainable solutions for land use and resource management? How do PES schemes respond to requests for equity and distributive justice?
In our session we will shed light on PES in the context of the sustainability discourse and discuss whether - and, if so, how - this governance strategy can contribute to sustainable development. The organiser of the session will begin the session with a short introduction of the current state of the debate on ecosystem services and PES. Following that, Stefan Baumgärtner will open the discussion by challenging the idea that PES is an adequate governance strategy for meeting a sustainability objective like distributive justice. Barbara Muraca and Lieske Voget-Kleschin will address philosophical issues of axiology and theory of justice in their examination of PES. Using their suggestions for improving PES-driven governance as a baseline, we will finally discuss Franziska Wolff's critical assessment of international PES, including at the example of REDD+, which queries the environmental effectiveness of these schemes.
In summary, the session comprises the different views - from economists, philosophers, political and social scientists - on a current topic.

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Payments for ecosystem services - for efficiency and for equity?

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Keywords: allocation; distribution; ecosystem services; efficiency; equity; payments for ecosystem services; policy objectives and instruments; welfare economics

The Millennium Ecosystem Assessment (2005) found that 15 out of 24 ecosystem services, which are essential for human well-being, are globally declining. This includes provisioning services (e.g. the provision of food, fiber, fuels or clean drinking water), regulating services (e.g. climate regulation, erosion control, or the regulation of pests and diseases), and cultural services (e.g. aesthetic satisfaction, education, recreation, or spiritual fulfillment). Ecosystem degradation thus is not only of mere environmental concern, but also implies a threat to human welfare and sustainability. Effective means to address, and potentially reverse, ecosystem degradation are thus needed.

Against this background, payments for ecosystem services (PES) are advocated as an institutional remedy for a host of intertwined sustainability problems:
(i) PES should halt, or at least slow down, environmental degradation - namely the degradation of ecosystems that provide critical services to humans. Many of these ecosystem services are not rewarded so far to those who have to carry their opportunity costs, and are, therefore, often systematically neglected in decision-making at the local, regional and global scales.
(ii) PES should internalize the positive externalities that arise from ecosystem services, many of which are public goods (i.e. non-rival in, and non-excludable from, consumption). Externalities are a well-known source of inefficiency, that is, aggregate economic welfare is lower than what it potentially could be in a given social-ecological system. In this logic, PES are argued to increase the efficiency of the global allocation of scarce goods and, thus, to increase global economic welfare.
(iii) PES, at the global scale and at bottom line, imply large payment flows from beneficiaries of ecosystem services in "developed", yet already environmentally impoverished, countries of the North to providers of ecosystem services in economically poor but biodiversity-rich countries of the South. PES are therefore seen by many as making an effective contribution to poverty reduction and establishment of more social equity.

While PES-schemes can, in actual reality, fail to achieve any of these objectives for many different reasons, the question addressed in this paper is: can PES be used, in principle, as an instrument to simultaneously achieve all three objectives, or is there a trade-off between these objectives? As PES, when properly designed, will certainly achieve objective (i), i.e. improve the status and trend of ecosystem degradation, the question then is: can they achieve this in a manner that is both economically efficient (objective ii) and socially equitable (objective iii), or is there a trade-off between economic efficiency and social equity in using PES?

From the theory of economic policy it has long been known that, in general, to attain two different objectives one needs at least two independent policy instruments - the so called "Tinbergen rule" due to Tinbergen (1952, 1956). This applies also to the use of PES as a policy instrument: in order to attain both efficiency and equity in the use of ecosystem services, a single instrument - say, PES - will not do,

but one needs another, independent instrument.

In this paper, I use a two-goods-two-regions-general-equilibrium model to show that the combination of PES and a direct transfer of manufactured consumption goods (or, more generally: income or wealth), can succeed in attaining the two objectives.Among the two policy instruments, the division of labor is clear: while PES are for efficiency (and not for equity), the direct transfer of income/wealth is for equity. These roles cannot be switched or shared. For, PES establish a price for a hitherto non-marketed commodity, namely ecosystem services, and this price needs to be "right" in order for efficiency to hold. If this price was set too high or too low compared to its efficient level, say, out of a concern for equity, then this would spoil the efficiency of the resulting allocation of goods.

The conclusion, thus is, that PES can, in general, not be expected to by itself bring about a more equitable distribution of livelihoods. PES should therefore not be used for this purpose. What makes a lot of sense, though, is to use PES to achieve efficiency in the allocation of ecosystem services and other scarce goods. If policy wants to attain both equity and efficiency, PES need to be complemented by a direct redistribution of income or wealth that is independent of ecosystem-service levels and directed towards equity.

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Payments for Ecosystem Services (PES)

Axiological and justice issues

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Keywords: ecosystem services (ES); payments for ecosystem services (PES); axiology; justice; cultural values; aesthetic values; substitutability; participation; property rights

Introduction

Since the concept of ecosystem services (ES) seem to balance the quarrels of ecologists and economists, market environmentalism has gained popularity among environmental policy activists. However, a detailed discussion of PES's ethical aspects is missing so far. In this contribution we discuss the axiological and justice issues related to PES. To this end, we first show that the notion of ecosystem services raises several axiological issues, which bears ethically relevant consequences. (section 1). In a second step we then employ a conception of sustainability understood as claims for justice towards both contemporary and future human beings to point to several justice issues of PES. (section 2)

ES - Axiological Issues

Several scholars are critical of the ES-language because they see in it a merely instrumental view, which paves the path towards the commodification of nature. However, if one looks at the Millenium Ecosystem Assesment (MA) the issue of valuation of ES is much more complex. The MA tries to bring together two ethical-axiological perspectives: the inherent value of nature (with the Kantian category of dignity) and its merely instrumental value (with the Kantian category of price) (MA, Ch. 6). However, the MA itself is not clear about how to relate these two perspectives in a coherent value system for ES. Because it seems counterintuitive to relate the concept of ES to 'dignity' (inherent moral value of natural entities) is then a merely instrumental consideration of nature the only feasible alternative? In the paper we argue that depending on how human wellbeing is intended, the understanding of the human-nature relationship changes. We propose a more complex classification of values especially regarding:
o Cultural values: A non instrumental relation to nature might be an essential part of a consideration of human good life, which encompasses more than vital or material interests. Thus MA includes in the ES-List so-called cultural values.
o Aesthetic values (Hargrove 2003) and eudaimonistic values (Muraca 2011): These cannot be reduced to instrumental consideration, because such considerations do no capture the complexity of relation between ES and human well-being in a wider sense of the term.

Sustainability and PES - Justice Issues

In this contribution, we draw on the Brundtland-definition that conceives of sustainable development as

development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p. 43). We take this definition to capture the essential characteristics of sustainability, namely first, that sustainability is about distributive justice towards contemporary and future humans - that is, inter- and intragenerational justice. Second, claims for sustainable development presuppose certain scarcity in the resources that are necessary to achieve justice, most prominently natural resources. In regard to sustainability and PES we will raise the following issues:

o Substitutability: A crucial element in the sustainability discourse is whether and how far Natural Capital (that is, those aspects of nature that form constitutive preconditions of a good human life) is replaceable by other kinds of capitals. Since the idea of PES relies on the possibility of monetization of ES, this is of fundamental importance for the concept of PES. According to the axiological classification mentioned above the question of monetization of ES has to be posited in a different way: monetization implies the idea of a possible equivalent for a service x, i.e. it tacitly implies the substitutability of or compensation for x. Such a consideration is ethically acceptable only under the condition that 1) x is indeed substitutable, 2) its substitution is morally justifiable (if x is considered as an inherent moral values, it is not), 3) it is (ethically) acceptable and in fact accepted by those who are involved (current living and future generations). While 1) and 2) point back to axiological issues as dealt with in section 1, 3) arises the issue of participation which we see as the main issue of justice regarding PES and sustainability

o Participation: To qualify as not violating intragenerational justice, participation in the decision processes, including the establishment of multifaceted languages of valuation, have to be secured: which and whose valuation language is used, which are (respectively) adequate to the issue at stake; who has a say in the matter, how the access to information and factual participation in processes of decision making are guaranteed and factually enforced. Since we conceive of sustainability as assigning equal importance to intra- and intergenerational justice, PES do not qualify as contributing to sustainable development if these conditions are not met.

In the final part of the section we address concrete proposals how participation can be specified and analyzed, focusing on (cf. Brown & Corbera 2003, Corbera et al. 2007)

o Issues of access and property rights

o Issues of institutions and decision making (including the ethical aspects of an ‚institutionalization' or ‚habitualization' of PES)

o Consequences of PES-projects for for different stakeholders.

Last but not least we ask if evaluating justice issues of PES should refer to a business as usuall (BAU)-scenario or should rather aim at a more ambitious idea of ideal PES.

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International payments for ecosystem services

A governance strategy for sustainability?

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Keywords: payments for ecosystem services; effectiveness; CDM; REDD; forest carbon; access and benefit-sharing; CBD; Nagoya Protocol; ITPGRFA

How effective are international payments for ecosystem services as governance strategy for ecological sustainability? Addressing this question is timely considering that over the past decade, markets and payment schemes have increasingly been established to promote environmental protection and, more specifically, the provision of ecosystem services. These are the 'benefits people obtain from ecosystems' such as the regulation of climate and floods, food and timber provision, soil formation, or opportunities for recreation (MA, 2005). Creating environmental markets is a cornerstone of ecological modernisation (Hajer, 1995).

While at domestic level, market-based instruments have taken root in environmental and land use policies in the 1980s, the discourse on and introduction of them into international governance came with a delay of one to two decades. In the meantime, various international policy instruments exist that create or harness ecosystem markets, among others the forest projects under the UN climate convention's Clean Development Mechanism (CDM) and the biodiversity convention's rules establishing markets for genetic resources. More recently, the UN's Millennium Ecosystem Assessment (MA 2005) has argued that the loss and degradation of ecosystem services was intrinsically linked to the insufficient monetary appreciation of the frequently 'invisible' functions of ecosystems from which humans benefit. To address this, markets (e.g. through cap-and-trade systems) and payments for ecosystem services have been promoted over other policy instruments in a somewhat one-sided way. The MA's call for incentive mechanisms has been reiterated by the international Stern-Review (2006) and the TEEB Initiative (2010).

Governance through ecosystem markets and payments is typically based on the assumption that price signals help internalising environmental externalities and that they are more efficient (cost-effective) in managing environmental resources or ecosystem services than other, particularly regulatory instruments (e.g., Baumol and Oats, 1988; Coase, 1960; Daly, 1977; Pigou 1920; Wunder 2005). Market- and incentive-based approaches are not uncontested though, particularly with regard to the governance of ecosystem services: critics argue that the commodification and pricing of nature's services involves serious technical and ethical difficulties (Kosoy and Corbera 2010; Vatn 2010). Empirical studies have shown that individual instruments fall short in accounting for local contexts as well as in enhancing conservation, and have failed to promote more legitimate forms of decision-making or equitable outcomes at local levels (e.g. Corbera et al. 2010; Liverman 2004; Martinez-Alier 2002; McAffee 1999; Muradian et al. 2010; Van Hecken and Bastiaensen 2010).

Against the background of the international diffusion and discursive dominance of market-based instruments for ecosystem governance, the paper takes this dispute as starting point to ask what the evidence is for the performance of international markets and payment schemes for ecosystem services. First, I give an overview of the shift towards market-based governance in international environmental politics and discourses over the past two decades. Section 2 introduces four international market or

payment schemes in international climate and biodiversity policy and describes how these (are intended to) work. The instruments include: (a) the CDM rules for afforestation and reforestation projects; (b) the emerging mechanism on 'Reducing Emissions from Deforestation and Forest Degradation in Developing Countries' (REDD+); the regimes for access to genetic resources and benefit-sharing from their utilisation as created (c) by the CBD and its Nagoya Protocol as well as (d) by the International Treaty on Plant Genetic Resources for Food and Agriculture ('International Treaty' or ITPGR). In the cases (a) and (b), the targeted ecosystem service - a so-called 'regulating' service - is forest-based carbon sequestration which contributes to global climate regulation. In the cases (c) and (d), the schemes aim to conserve and sustainably use genetic resources. As a 'provisioning' ecosystem service, genetic resources form the basis for many products in the biotechnology, pharmaceutical, cosmetics, crop protection, seed, and other sectors. Implicitly, instruments (c) and (d) also aim at securing the ('regulating') ecosystem services of disease control, drought resilience etc. linked to genetic diversity in situ or on-farm. Section 3 more specifically traces how the instruments are intended to create ecosystem impact ('policy pathways') and what the empirical evidence is on their actual impacts. I argue that none of the instruments is (yet) particularly environmentally effective. This has to do with factors such as flawed assumptions regarding the creation of incentives; inadequate regulatory framing; and small market sizes. Methodologically, the section is based on the reconstruction and analysis of "intervention logics" (Kautto and Similä 2005; Gysen et al. 2006; Leeuw 2003; Weiss 1998), on document analysis as well as a review of the available literature on the instruments' effectiveness. In the conclusions I propose to relate the environmental performance of the instruments to the following variables: characteristics of the (environmental) 'service/product' and the markets in question; institutional safeguards; and the instruments' acceptance by market participants and stakeholders.

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AFS: Sustainable Development, Energy and Justice

Sustainable development, energy and justice

Measuring the distribution of Rawls's basic goods

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Keywords: Sustainable development; energy; justice; Atkinson index

Since earliest times, people have striven to improve their living conditions. The "universal currency" [1] used to measure this improvement is the amount of energy used. The abundance of energy is the fundamental determinant for the quality of life. In this paper, we will examine how the quality of life is distributed among the members of society. These distribution effects are of great political interest at a time when the discussion about growing social disparities is playing an increasing political role in the public discussion [2-6]. Achieving justice has therefore become an important sustainability goal encompassing the economy, social and environmental purposes [7-14].

The political interpretation of the distribution of social welfare confronts society with a structural political problem as K. Gordon(1) explained. On the one hand, political and social institutions grant the same universal rights and privileges to all citizens [15]. "But its economic institutions rely on market-determined incomes that generate substantial disparities among citizens in living standards and material welfare [15]." This mixture of the same rights and unequal income generates social tensions between the political principles of society and the economic principles of capitalism [15, 16]. Gordon's trade-off touches central aspects for the stability of society which are also central for the concept of sustainable development. The Brundtland Commission defines sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs [13]" and thus defines intra- and intergenerational justice as central principles for sustainable development and for social stability.

In the context of sustainability, this leads us to ask how we can achieve justice and thereby work toward social stability. Rawls formulates principles that help to distribute the goods produced in a generation fairly [17]. Rawls understands society as a cooperative system, as an enterprise of cooperation for the mutual benefit of all. Its members perceive social cooperation as advantageous and resulting in a better life than remaining independent of society. Conflicts of interest between society's members (Gordon's trade off) result from the distribution of social goods. Standards and procedures of conflict resolution must be established to prevent society from being torn apart by conflicts of interest over access to limited goods [3].

Rawls postulates the priority of justice before any consideration of institutional efficiency in Gordon's trade-off example. The basic principles of Rawls's theory require that the basic structure of society is constituted in such a way that all humans have access to certain basic goods such as income, certain liberties, opportunities, as well as basic self-respect [17]. In our paper, we enlarge Rawls's definition of basic goods by including the energy expenditure of households. Our decision to include energy expenditure is based on Smil's definition that energy is an indicator of the quality of life and the

universal currency of the improvement of life.
In our analysis, Rawls's theory of justice formulates the distributional principles for the fair distribution of basic goods. The epsilon parameter of the Atkinson index enables us to transform society's assessment of Rawls's principles into a quantifiable parameter for measuring the distribution of basic social goods (income, consumption, energy) with the Atkinson index. The Atkinson index provides political decision-makers with information and data about Rawls's principles, Gordon's trade off and stability of society. The results of applying the Atkinson index could make a significant contribution to science and policy debates on income and energy equity in the context of sustainable development. For our analysis, we used disaggregated consumption and income data from the German Household Expenditure Survey conducted by the German Federal Statistical Office in 2008 and published in 2011 [18, 19].

(1) Kermit Gordon (1916-1976) was Director of the United States Bureau of the Budget (now the Office of Management and Budget) (December 28, 1962 - June 1, 1965) during the administration of Lyndon Johnson and President of the Brookings Institution. He oversaw the creation of the first budgets for Johnson's Great Society domestic agenda. Gordon was a member of the Council of Economic Advisors, 1961-1962.

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Energy price shocks

Sweet and sour consequences in developing countries

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Keywords: energy price shocks; social justice; sustainable development

An interesting literature emphasizes the negative impacts of energy price shocks on growth in developing countries. A recent paper from Kojima 2011 maps developing countries in terms of their vulnerability to higher oil prices (the measure of vulnerability is expressed as the share of GDP spent on net oil imports) and finds that vulnerability increased in 82 percent of countries, especially in Africa. Africa also had the highest share of countries in which rising oil intensity (oil consumed per unit of GDP) exacerbated rising vulnerability. Energy intensity is one of the main causes of oil price vulnerability because countries which have higher energy intensity - those that require more energy per unit of economic output - tend to suffer from deeper recessions and are more susceptible to price shocks. On the other hand developing countries may benefit from energy price raises when they are net exporters of energy sources. One of the main mechanisms of transmission of changes in international oil price changes to the oil-exporting countries' economies is through impacts in the government revenue and expenditure, as in many of these countries oil revenues accrue to the government (Berument et al. 2011). It is evident that the issue of energy prices shocks is strongly interconnected to the discussion about justice and sustainable development because of the strong link of energy price fluctuations with poverty and social exclusion.

This work offers an original and broad overview of the energy prices shocks theme by focussing specifically on the impact on developing and poor countries with different sections describing:

1) The transmission channels linking energy prices to growth in developing countries.
2) A quantification of the impacts of the energy price shocks in developing countries with a mapping exercise to identify the most vulnerable countries by a Computational General Equilibrium Modelling exercise.
3) A case study analyzing more in detail situations where energy price crises represented a danger to the economic growth and sustainable development in developing countries. Recent cases such as the recent Nigeria turmoil where energy subsidies were removed show the importance of the analyses of the most effective responses on energy price shocks and the role of groups and powers in determining the adoption of energy policies in poor countries;

On the basis of the above analysis we will draw policy insights and recommendations for the decision makers in terms of the most suitable policy responses to energy price shocks. With an original approach combining literature review, modelling and political economy analysis, the work is aimed at representing a tool for academics to show how the issues should be dealt with an interdisciplinary approach and for policy makers to gain insights on the most promising responses to tackle energy price shocks with a privileged focus on developing countries.

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Sustainable indicators for the assessment of energy systems

Tools for the development of innovative energy scenarios

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The concept of sustainable development was established in 1987 by the World Commission on Environment and Development in their report "Our Common Future" and spread quickly in the world of science, society and politics [1]. The Commission took up ideas and terms already established in the German forestry sector [2]. The Commission transferred the principles of sustainability from forestry to the overall social system: Sustainable development is defined as a social development: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs [1]."

Sustainable development should guarantee inter- and intragenerational justice which would enable humanity to both overcome poverty in developing countries and maintain standards of living in industrial countries. This process should be brought in line with the preservation and protection of nature. A basis for this is an integrative (global) policy strategy bringing together previously unconnected policy areas such as environmental pollution, energy supply, population development, food, economy, finances, (inter)national security in a holistic approach.

Nevertheless, actors often refuse to systematically and understandably disclose the steps which lead to the definition, ascertainment and assessment of sustainable development. If a wide social and political consensus is aimed at, the following is necessary: The basic paradigms of sustainable development have to be revealed, the sustainability goals and their relation to each other must be disclosed; sustainable development has to be operationalized by developing an indicator system, and, if necessary, the database has to be extended to allow the degree of fullfilment of sustainability aims by society to be measured in a monitoring process. This is necessary because - as the German Council for Sustainable Development explained - without quantified aims for the sustainable indicators sustainability becomes an empty phrase [3].

Sustainable development is a process which tries to realize the goals of sustainability which are set by politics and society. These initially abstract goals must be concretized in the political and social discussion process, and operationalized for implementation in the monitoring process. The ascertainment of sustainable development can take place spatially (states, federal states, regions, local communities), and/or for economic sectors, e.g. the energy sector and its technologies. Socio-technical systems such as the energy system are complex systems consisting of subsystems which communicate with each other in different ways, which are connected in different ways and which are influenced intentionally or unintentionally by human actions. Social and political actors try to influence such systems by specific actions and to steer the system by aims which are formulated by consensus and in a transparent way.

After more than 20 years of scientific discussion about the outline of the concept of sustainable development, four elementary concepts can be identified: (1) ecological concept [4], (2) capital concept [5, 6], (3) the three or four-column concept (institutions as the fourth column) [7] and (4) multi-theme

concept [8, 9]. No concept meets with unanimous approval, but the multi-theme concept is increasingly used at the international level [8-10].
This new concept was also transferred in a general form to the energy sector [11]. In 2005, a coalition of international organizations (International Atomic Energy Agency (IAEA), United Nations, International Energy Agency (IEA), EU statistics authority Eurostat, European Environmental Agency (EEA)) introduced the indicator set Energy Indicators for Sustainable Development (EISD). The EISD System was developed from the perspective of a global sustainable energy system and should be complemented and specified for national analyses.
EISD follows the conceptual framework developed by the UN-CSD, and the indicators were developed for 7 main topics which have to be addressed in the context of sustainable development: Equity, Health, Use & Production Patterns, Security; Atmosphere, Water, Land. They are further split up into 19 sub-themes which are provided with indicators. The EISD system comprises 32 indicators and 56 measuring components [11]. It is stressed that the indicators, which were developed universally for all states, have to be specified for the individual demands of the specific country.
We decided to use the EISD indicator set, because it fullfils the criterion of international comparability and does not concentrate on the national level. Therefore, the EISD concept was adapted by IEF-STE to the conditions of Germany. The modified IEK-STE indicator set is policy-oriented, it fitted in an international concept, it is politically well secured, and widely quantifiable.
The first IEK STE indicator concept consists of 4 themes, 8 sub-themes and 10 indicators, which are assigned to social, economic and ecological issues. The STE indicator set forms the basis for the STE energy scenarios. Our approach makes clear that with the selection of the indicators the sustainable goals have to be concretized to measure the sustainable development of the German energy sector. On this basis, an ascertainment and operationalization of sustainability is made possible for the energy sector in Germany.

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The dilemma of electric generation in a small island

The case of Puerto Rico

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Keywords: eco-efficiency; energy recovery; Puerto Rico; pyrolysis; scrap tires

Puerto Rico (PR), a USA territory located in the Caribbean Sea, struggles to survive after been submerged for six consecutive years of economic recession. For the last 50 years, the Island's economy was robust due to the transformation from a rural-agriculture setting to one based in an urban-industrialized scenario. This evolution was the byproduct of intensive campaigns and benefits to attract foreign capital. One of the incentives was the provision of electrical energy at very low, or no costs to companies. But recent changes in the USA revenue policies for those companies, the shrinkage in the global economy, and the unstoppable rise of oil prices, has risen the electricity cost over US $ 0.25/kWh, triggering the exodus of many capital investments. Today, a rentable electrical energy provision is keystone social, environmental an economic issue to rescue the Island former stable economic growth. The highest tariffs for the provision of electricity are the consequence of an almost entire dependency on the unstable crude oil market to power and operate an obsolete electrical energy infrastructure. To correct the situation, the Government, but not the community, supports the establishment of a natural gas pipeline to increase the efficiency of the old thermoelectric power plants, aiming a decrease in the electricity cost. But within the half century of economic evolution, emerged a social flagellum that seems not to contribute to achieve the goal to aim sustainable development. Paradoxically in this poor development scenario, many islanders swagger of economic blowing, even though PR is the most indigent territory under the USA jurisdiction. In three generations, residents changed their lifestyle from producer to USA welfare dependents, and impulsive consumers. As a result, each person generates a daily average of 2.2 kg of garbage, from which 57% is organic. Parallel to the above mentioned blowing is the aspiration of almost every adult to own at least a car, given the low public support for massive transportation, and that owning a car is a symbol of social status. This practice carries the collateral generation and poor disposition of nearly five million/year scrap tires (ST). Tires contain pollutants, are not biodegradable, are frequently disposed in clandestine dumps, present low (4.2 %) recycling rate and poor reuse, and have not been considered locally for energy cogeneration, but are exported to the USA as an energy resource. However, the Government has not considered the use of ST for electric energy cogeneration. This article will theoretically analyze the potential of ST as an endogenous source for electrical energy cogeneration. If ST recycling increases to 10% and if it assumed that the mean caloric value of ST be 3.3 x 104 kJ/kg, it was estimated that scrap tires processed in a pyrolysis power plant can supply nearly 379,000 kWh, a potential value that shall not be unnoticed. Also, the article will present the ignominious panorama of the generation, handling and disposition of scrap tires, describes the legal framework, and present a new vision to invite the academia an the energy generation sector to validate this information.

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Integration of sustainable system indicators into an integrated assessment model for the valuation of the future global development

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Keywords: integrated assessment model; sustainable system indicators

The necessary change of behaviour as consequence of climate agreements and short resource supply herald the way for innovations like the development of renewables. To reach such ambitious aims like the protection of our climate the interaction of the whole system becomes more important and it has to be analysed how such solutions can look like. It is therefore of most importance to determine the relevant key influencing factors for a sustainable economical action and development. For the representation of the whole system in our model, the interaction of different sub-modules is in the foreground.

The focus of the present work is bounded by the energy model. The energy model is part of a so-called Integrated Assessment Model (IAM) consisting of a simplified land area-, population-, climate-, economy- and resource model. The frame of the model includes a global, worldwide level and the aggregate model considers a period and perspective till the year 2030. Single sub-modules have also been validated beyond 2030. In order to represent similar spatial and economic framework, the world is separated in regions, so-called agents.

In particular, the resource model makes use of an agent-based modeling approach. The resource allocation of the main fossil fuels is conducted by economic criteria and optimized for the perspective of a society, instead of an entrepreneurial attitude. The advantage of this approach is that autarkic agents can interact autonomously and trade bilateral with each other. In this way different depletion paths of fossil fuels for each agent can be analysed.

As one result, the model shows how in the short run natural resources like fossil fuels and agricultural land are exhausted due to increasing population and strong economic development of emerging economies.

To reach ambitious and sustainable aims like the reduction of the risks of global warming it is necessary to consider possible ways of sustainable economic and ecological ways. Therefore sustainable system indicators also need to assess future development. One possibility to handle uncertainties and risks is via integrated assessment models (IAM). In this paper, we ask as to whether and how sustainable indicators can be integrated into IAM. Particularly the global perspective and the requirements for future sustainable criteria may reinforce the use of measurable data like the gross domestic product as indicators. It is discussed as to how the capability approach as suggested by Sen and Nussbaum may be of value for defining sustainability criteria for a sustainable energy supply and demand.

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AFS: The contribution of System Dynamics to Sustainable Development

Introduction to the Additional Full Session "Systems Thinking & Sustainable Development"

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Keywords: systems thinking; sustainable development; additional full session

On a very general level, Systems Thinking may be defined as a "framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'" (Senge 2006: 68). Over the last decades, Systems Thinking emerged as an alternative to the reductionist approaches of mainstream science. Such approaches were seen to be ill-equipped to deal with the complexity of real-world problems (Checkland 1993: 245). Systems Thinking methodologies were seen to be particularly well suited to analyze specific environmental problems. In addition, Systems Thinking has made crucial contributions to the analysis of a Sustainable Development. Publications from the field of System Dynamics (Forrester 1971; Meadows et al. 1972) were among the pioneers that analyzed sustainable development as a crucial societal issue. Their analysis of global long-term trajectories inspired a whole generation of scientists and activist to search for a more sustainable development.

In this session we will discuss three studies that apply the Systems Dynamics methodology in a Swiss context. Gallati and Hügel investigate the role that incentive mechanisms play in the transformation of the energy supply system and energy consumption patterns toward the vision of a 2000-watt society. They illustrate how progress toward a sustainable development may be supported by the analysis of the causal mechanisms that drive transformation processes. In particular, they elaborate on their prototype of a model of the incentive mechanisms in the photovoltaic sector. Similarly, Ulli-Beer, Boksberger and Wokaun point to the specific contributions that systems modelling makes toward a scientific understanding of sustainability transitions. Typically, systems modeling draws on non-systemic empirical studies. However, it carries the analysis further by showing how various elements interact and lead to a specific system behavior. They illustrate their argument with examples from a recent study of the transformation of the European carmaker industry toward more sustainable road transportation. Müller and Ulli-Beer developed a System Dynamics simulation model of the diffusion of energy-efficient renovations that entails the building stock, supply and demand on the housing market, technology and policy change. In their contribution, they illustrate how insights derived from systems modeling led to the formulation of specific policy recommendations.

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mechanisms to increase energy efficiency and to stimulate renewable energies.

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[7] Ulli-Beer, S., Boksberger, B. and A. Wokaun (in this session): How can deterministic simulation modeling enhance the scientific understanding of sustainability transitions?.

Policy modeling

A system dynamics approach for the analysis of incentive mechanisms to increase energy efficiency and to stimulate renewable energies

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Keywords: socio-economic transformation; 2000-Watt society; incentive mechanisms; system dynamics; simulation model

Transitions toward a more sustainable future require numerous socio-economic transformations. This is a transdisciplinary endeavour asking for instruments that involve stakeholders, enable the analysis of long-term developments and allow for the anticipation of potential future dynamics, hence contributing to the generation of a common understanding of a specific problem and potential solutions. Moreover, these instruments have to cope with the challenge that high uncertainty about future development is prevailing, while on the other hand there is a vital need for more transparent decision making processes. Policy modelling is understood here as an approach that contributes to informed decision making based on a thorough understanding of the underlying causal mechanisms. It is argued that system dynamics in particular is a promising candidate for this type of transdisciplinary research for sustainable development. In particular it is able to cope with the long-term aspects and dynamics of a problem, as well as with the complexity and interrelatedness of a specific problem.

The project presented here seeks to address the role of incentive mechanisms for a transformation in energy supply and energy consumption in a number of Swiss cities (2000-Watt society). Strategies for a transformation towards a 2000-Watt society are being developed at various levels. Cities in particular are important to carry on these processes by a number of different policy measures. Amongst them incentive instruments play a crucial role. However, there is a lack of understanding regarding the underlying causal mechanisms and in particular of the long-term effects of these policies. Main research objective of this project is to investigate these mechanisms and to develop a simulation model to analyse the effect of different incentive policies at city level. In particular, it is asked which incentive instruments should be implemented, how long they should be in place, and how much the cities should spend in order to achieve an optimum impact (and to avoid unintended side-effects). Should the policy measures be targeted at promoting currently available technologies and/or towards new innovative products and technologies? What is the optimum mix between short-term and long-term measures? Moreover, the question is asked about the effect of specifically targeted incentive measures (e.g. for the deployment of photovoltaic modules) in comparison with instruments at systems level (e.g. introduction of an energy tax, etc.). As such the project starts from a general typology of incentive mechanisms aiming at developing a causal dynamic model that incorporates these mechanisms in a generic way.

At this stage of the project results of a prototype model about incentive mechanisms in the photovoltaics sector are presented. Developing a prototype model first is considered particularly important due to the high complexity of the entire project and as a means to involve the stakeholders at an early stage of the project. Insights are presented with regard to the simulation model and model results as such, but also with regard to the process of stakeholder involvement and with regard to the design of graphical user interfaces that are appropriate to provide decision support for these

stakeholders. Further project development will aim for transferring these insights to other energy sectors, in particular to the building sector.

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Policy Implications from a System Dynamics Modeling Study of the Diffusion of Energy-Efficient Renovations in Switzerland

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The building sector accounts for about a quarter of energy-related greenhouse gas emissions and consequently it is a key lever in climate change mitigation efforts (Levine et al., 2007). In the long run, this calls for nothing less than a radical transformation of the built environment (Barrett, 2009). In particular, the stock of buildings built before the 1990ies will have to be retrofitted with current energy-efficiency technologies such as insulation, ventilation and low-emission energy systems (Jochem 2004; Jakob 2006; Jakob 2007).

In a recent study, we analyzed the diffusion of energy-efficient renovations in Switzerland's stock of residential, multifamily buildings (Müller, submitted; Müller & Ulli-Beer 2010; Müller & Ulli-Beer 2008). Specifically, we built a System Dynamics model that explains how the market, technology, civil society and the state govern the diffusion of energy-efficient renovations and the CO2 emissions of the stock of buildings. The resulting model, spanning the years from 1975 to 2100, allowed us to analyze the following research question: How can the diffusion of energy-efficient renovations of buildings be accelerated in order to reduce the CO2 emissions from the stock of buildings?

In the following, we present the most important results from our study. By doing so we hope to provide practically relevant insights for public policy. Beyond the narrow `use value' of our research we hope to make several exemplary contributions to research in the spirit of ecological economics and sustainability science. For example, our study might be seen as an illustration as to how different fields of society are intertwined and involved in the creation and governance of environmental issues.

Our work is based on information obtained from expert interviews, the literature, one expert workshop and public statistics1. Methodologically, our study is best described as theory-building with System Dynamics (Schwaninger & Grösser, 2008; Schwaninger & Hamann, 2005). In order to obtain the System Dynamics simulation model, we developed four analytical perspectives. Specifically, we analyzed the context within which the diffusion of energy-efficient renovations becomes relevant. We built a small simulation model of the stock of buildings and conducted preliminary policy analysis (Müller & Ulli-Beer, 2010). We analyzed actors and we developed an endogenous theory of the causal drivers of the diffusion of energy-efficient renovations. Then, the insights obtained from the analytical perspectives were synthesized into a simulation model. Throughout the research process we iterated as we deemed appropriate. In addition, we conducted desktop research and we routinely tested and verified our preliminary results as well as the resulting simulation model.

The model was used for policy analysis. First, we identified practically relevant intervention levers by reviewing the large simulation model. Second, we analyzed each of the relevant intervention levers in a standardized manner. We increased the strength of an intervention lever by 50% after the year 2010 and compared the resulting model behavior with the base scenario in the year 2020. Due to the lack of

rigorous numerical data we partially relied on educated assumptions to be put into the model. In consequence, the results from the analysis of intervention levers should be considered to be generally indicative of the direction of effects. Despite a lack of high precision, our approach allowed us to identify high-leverage intervention levers and roughly quantify the effect of different policies on the CO2 emission rate.

For example, we simulated a scenario in which a broad series of interventions was carried out after the year 2010. Consequently, almost all buildings under renovation implemented an energy-efficient building design. In this `best case' scenario, the CO2 emission rate decreased by about 51% over the period 2010 to 2050. By the year 2100, a reduction of about 66% had materialized. In the base scenario, much smaller emission reductions were achieved; about 32% by 2050 and about 45% by 2100.

Eventually, we concluded that energy efficiency is important yet not sufficient to reach the goals of a 1-ton- CO2- society by 2100. Mostly, it is the inertia of the stock of buildings that impedes a quick diffusion of energy-efficient building designs in renovations. Therefore, Switzerland should attempt the far-reaching decarbonization of heating systems as a complement to current energy efficiency-oriented strategies.

Based on the results from our modeling study, we propose two regulations that could achieve such a decarbonization effort if implemented:
o Until the year 2050, zero- or low- CO2 emission heating technology has to be implemented in every building built before the year 2000.
o Until the year 2020, building owners have to submit a roadmap that details how low-emission energy systems will be implemented in their building and how they intend to finance their road to a zero-emission building.

The first regulation would make it economically rational for building owners to decarbonizes their buildings many years before the deadline, or else risk having to retrofit their building outside of the renovation cycle. Further, this could lead entrepreneurs and construction companies to expect a large future market and develop the technologies and business models required for such a transition process. The second regulation would ensure that building owners pursue a long-term planning perspective. That is particularly important when renovations are conducted step-by-step.

These regulations constitute a framework within which current efficiency-oriented public policies would be reinforced. In practice, a series of challenges would need to be overcome, such as how to sanction non-compliance or how to deal with heritage buildings. Nevertheless, these regulations would create substantial challenges for building owners without professional know-how. In order to facilitate compliance, we propose a service innovation called "Immobility". The service organization would assist building owners in developing an adequate long-term strategy for their building, implementing adequate renovations and provide a whole range of further assistance.

Endnotes

1 See the forthcoming full paper submitted by Müller, Ulli-Beer et al. to the System Dynamics Conference 2012 in St. Gallen, Switzerland or Müller (submitted, chapter 2) for more detail on the research methodology.

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How can deterministic simulation modeling enhance the scientific understanding of sustainability transitions?

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1. Introduction

The ambition of the article is to link theorizing on (socio)-technical change with white box modeling and simulation. We see the linkage as a potential means to strengthen qualitative empirical research and findings on (socio)-technical change. We argue that this combination enhances the scientifically grounded knowledge on socio-technical change beyond descriptive findings of case studies. We address the strength and limitations of sustainability transitions research and simulation studies. Some argue that simulation studies grounded in functionalism cannot be combined with descriptive case studies grounded in interpretivism and constructivism[1]. We argue that simulation models can build on findings of descriptive case studies. For example case study may help to identify how qualitative change in the socio-technical transition comes about. White box modeling and simulation may be used to operationalize and validate the dynamics of a coherent transition story. Hence, both perspectives in combination increase the validity of scientific understanding.

2. The strength and limitations

Empirical case studies on socio-technical transition help to identify possible mechanisms that may explain the transition. They identify the rules that guide action and perceptions of real actors. Those may serves as input to a simulation study. White box model maps the rules of agents in terms of mathematical equations. The analytical power of simulation studies lies not in identifying the most important actors, their resources or their decision rules but in analyzing the resulting system behavior. Hence, simulation studies allow identifying most effective causal circularities with their polarities. Likewise, they allow analyzing the dynamical implication of the assumed causal determinants. For example, system dynamics modeling practice provides scholarship on how to systematically reduce empirical complexity into a causal conceptual model towards a rigorously formulated simulation model. It helps to differentiate between exogenous variables that should be considered for the simulation study and those that can be excluded. It distinguishes exogenous modeling inputs from endogenous causal circularities that explain alignment processes. In a further step, the simulation model can be used as a scenario and policy analyzing tool. Different scenarios, as well as strategy and policy approaches supporting the socio-technological transition can be assessed whether they are robust and economically feasible. However, simulation studies have also basic shortcoming. For example sense making, and interpretation efforts of actors can only be mapped based on empirical case analysis. Furthermore, ongoing structural change processes that co-evolve in socio-technical transition cannot be analyzed.
Although, we acknowledge the limitation from the deterministically given structure of the white box model, we argue that simulation models grounded in qualitative theorizing on (socio-) technical

transition make them accessible to analyze the resulting system behavior. We will corroborate and illustrate our arguments with a simulation study that map the main transformation processes of eco innovation in the European car maker industry.

3. Integrative Transition Modelling: The case of the eco-innovation in the carmaker industry

The model concept mapped in Fig. 1 provides a high level overview of the ITM that highlights model boundary, the main model inputs and the interconnected modules with its main variables[2]. The modules are interconnected with variable specific information flows. The landscape level comprises of the environmental policies, consumer preferences and the existing fuel infrastructure, but also income trends and population dynamics. The three modules FINANCES, R&D, and PRODUCTION capture the processes internal to the firm. The MARKET module presents the near environment. It is influenced by landscape specific inputs.

Fig. 1: Model concept: The model consists of four modules. Each module involves a set of subsystems. In addition, different classes of firms, technologies, fuels and markets are specified by subscripts.

The main feedback loops that control the transition towards near zero emission vehicles in the ITM are highlighted in the causal loop diagram shown in Fig. 2. The diagram nicely distinguishes the loops that control an incremental maturation and endogenous transformation mode.
On the hand the incremental maturation is explained by the four reinforcing loops r1 to r4. The research paradigm in this mode guides the enhancement of vehicles primary performance attributes (i.e. acceleration, driving range, the refueling or recharging time, and weight as a measure for safety). On the other hand the endogenous transformation process is mainly governed by the three balancing loops b1 to b3. They balance a perceived performance gap concerning energy consumption and are related to the emergence of a new research paradigm. It guides the establishment of the technological improvement trajectory emphasizing energy consumption and CO2 emissions per technology. These attributes characterize the 'Secondary Performance' variable. 'Energy Cost' or 'Policy Pressure' from CO2 emission regulations force the carmakers to intensify their R&D expenses on 'Secondary Performance'. A prolonged induced pressure causes in a first step a research paradigm change. Due to system inertia, once the external pressures have been reduced, carmakers would keep their new ratio between primary and secondary performance R&D constant. Where a research paradigm change is not sufficient to reduce the external pressures, carmakers will in a second step undergo a technology dominance change. Their long term focus will move away from incumbent technologies towards a single or a portfolio of new technologies that are better suited for the changed regime. However, while the reinforcing loops r1-r4 have supported the incremental transformation path, they may act as barriers for the endogenous transformation path. This may occur when ever either 'Revenues', 'Selling Price', 'Fuel Infrastructure Construction' or/and 'Additional Types' of the alternative technologies are not competitive with the established technology.

Fig. 2: Causal-loop diagram: The causal loop diagram highlights the main causal circularities of the industrial transformation towards near zero emission technologies in the carmaker industry. Positive

correlations are marked with a (+) sign, negative with a (-) sign. There are four reinforcing loops (r1-r4) and three balancing loops (b1-b3).

4. Discussion and conclusion

The causal loop diagram and the simulation findings allow for a validation of structure and system behavior. For the chosen industrial transition perspective three different behavior patterns have been of interest: The diffusion path of multiple competing drive train technologies, second the economic viability of market leaders, and third the prospective CO2 emission pathways of the light duty vehicle fleet (LDV) in the EU. Will be elaborated further.

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