

Kumulative Habilitation/Cumulative Habilitation

zur Erlangung/for attainment

der Lehrbefugnis für das Fach „**Systemisches Management**“/
of the Venia Legendi in „**Systemic Management**“

mit dem Titel/with the title

**Management of Collaborative Creativity for
Sustainable Innovation: a Systems View**

eingereicht an der/submitted to

Karl-Franzens-Universität Graz, Österreich/
University of Graz, Austria

von/by

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1. LIST OF PUBLICATIONS TO BE PEER-REVIEWED

Twelve publications were selected to be part of this habilitation (please see also the total list of publications as part of the Curriculum Vitae/Appendix.). These are supposed to give an impression of my most recent fields of research, referring to the years 2005 to 2008 (for earlier articles please see the publication list within the attached CV). Thereby, also some exploratory ideas on chaotic systems are included as a starting point for further future research.

Internationally peer-reviewed articles

The submitted contributions have all undergone international in-depth review processes for publication that were at least based on a double-blind review process, except the only included German article “ERP-Innovationsgenerierung”, which was reviewed by the editors. All the articles contribute to the general topic “Management of Collaborative Creativity for Sustainable Innovation: a Systems View.” The importance of collaborative creativity not only for innovation, but for any complex system – such as sustainable innovation and sustainable development – was specifically expressed when being awarded with the international Best Paper Award in the track “Management and Organizational Behavior” for the paper “Organizational Creativity as a Prerequisite for the Generation of Innovation” from the Western Decision Sciences Institute in the U.S.A. This paper was a pre-version of the here included publication for the Journal of Business and Management.

The three thematic core themes are:

- Innovation and Research & Development (R & D)
- Sustainable Development: from Enterprises to Regions
- Management Education

Every article contributes to all three themes, although to a different extent. Hereby some papers can be understood as further development of the previous articles (such as the article on collaborative creativity 3.1.4. as further development of the article 3.1.3.; the two articles on transdisciplinary case studies, 3.3.1. and 3.3.2, share a common theoretical basis, but with a varying focus concerning the investigated case/s), however with different thematic emphasis. The inner coherence of this work is explicitly explained in chapter 3.

A. INNOVATION AND RESEARCH & DEVELOPMENT

Steiner, G. (2006): **Innovation as a two-sided coin** with special consideration of analogies. In: Conference Proceedings of the 50th Annual Conference of the International Society for the Systems Sciences (ISSS). CD-Rom Conference Proceedings. Sonoma: Sonoma State University.

Steiner, G. (2005): Innovation and creativity from the viewpoint of **systems thinking and chaos theory**. In: Gu, J./Chroust, G. (Eds.): The New Roles of Systems Sciences for a Knowledge-based Society. CD-Rom Conference Proceedings. Tokyo: JAIST (Japan Advanced Institute of Science and Technology) Press.

Steiner, G. (2006): The **Planetary Model** as an organizational framework for the generation of innovation. A critical reflection on today's innovation practice. In: Our Economy Review NG 52, 1-2, 2006, pp. 18-23.

Steiner, G. (2008): The concept of **Open Creativity**: collaborative creative problem solving for innovation generation - a systems approach. In: Journal of Business and Management 15(1) (in press).

Steiner, G. (2008): Supporting sustainable innovation through **stakeholder management**: a systems view. In: International Journal of Innovation and Learning 5(6), pp. 595-616.

Steiner, G. (2006): How to support the enterprise's capability to generate radical innovation: what can be learned from the U.S.'s most innovative company **IDEO**? In: Rebernik, M./Mulej, M. (Hrsg.): STIQE 2006 – Proceedings of the 8th International Conference on Linking Systems Thinking, Innovation, Quality, Entrepreneurship and Environment. Institute for Entrepreneurship and Small Business Management/Faculty of Economics and Business, Maribor, 203-212.

Steiner, G. (2006): **ERP-Innovationsgenerierung**. In: Mandl, D./Schuetze, J./ Riesslegger, H./Rumpf, M.: Multigap-Accounting mit der Oracle E-Business Suite. München: Addison-Wesley, Edition Oracle, 241-246.

B. SUSTAINABLE DEVELOPMENT: FROM ENTERPRISES TO REGIONS

Steiner, G./Mader, C./Risopoulos, F./Zimmermann, F. (2008): Transdisciplinary change processes and transdisciplinary research for a sustainable future: the role of **Regional Centres of Expertise** on education for sustainable development (RCEs). In: Environmental Education Research (revised).

Mader, C./Zimmermann, F.M./Steiner, G./Risopoulos, F. (2008): **RCE** Graz-Styria – a process of mobilization facing regional challenges. In: International Journal of Sustainability in Higher Education (in press).

C. MANAGEMENT EDUCATION

Steiner, G./Laws, D. (2006): How appropriate are famous concepts from **higher education for solving complex real-world problems**? A comparison of the Harvard and the ETH case study approach. In: International Journal of Sustainability in Higher Education 7(3), 322-340.

Steiner, G./Posch, A. (2006): Higher education for sustainability by means of **transdisciplinary case studies**: an innovative approach for solving complex, real-world problems. In: Journal of Cleaner Production 14, 2006, 877-890.

Posch, A./Steiner, G. (2006): Integrating research and teaching on **innovation for sustainable development**. In: International Journal of Sustainability in Higher Education 7(3), 2006, 276-292.

2. OUTLINE OF THE INNER COHERENCE OF THE SUBMITTED PUBLICATIONS

This cumulative habilitation treatise on “*Management of Collaborative Creativity for Sustainable Innovation: a Systems View*” is based on English publications of the habilitation applicant (except the paper on ERP systems, which is written in German).

Hereby, this work tackles the three main topics of “*Innovation and Research & Development (R & D)*”, “*Sustainable Development: from Enterprises to Regions*” and “*Management Education*” with special focus on collaborative creativity (by utilizing the system’s internal and external creativity sources, including the system’s accessible environment), the potential of transdisciplinary problem-solving as an appropriate means for bringing together academics and society, and educational measures for dealing with complex real-world problems. Those fields of research are all directed towards the meta goal of sustainable development. This work is based on the philosophy that sustainability as well as sustainable innovation systems can be understood in a broader sense by applying a systems thinking perspective.

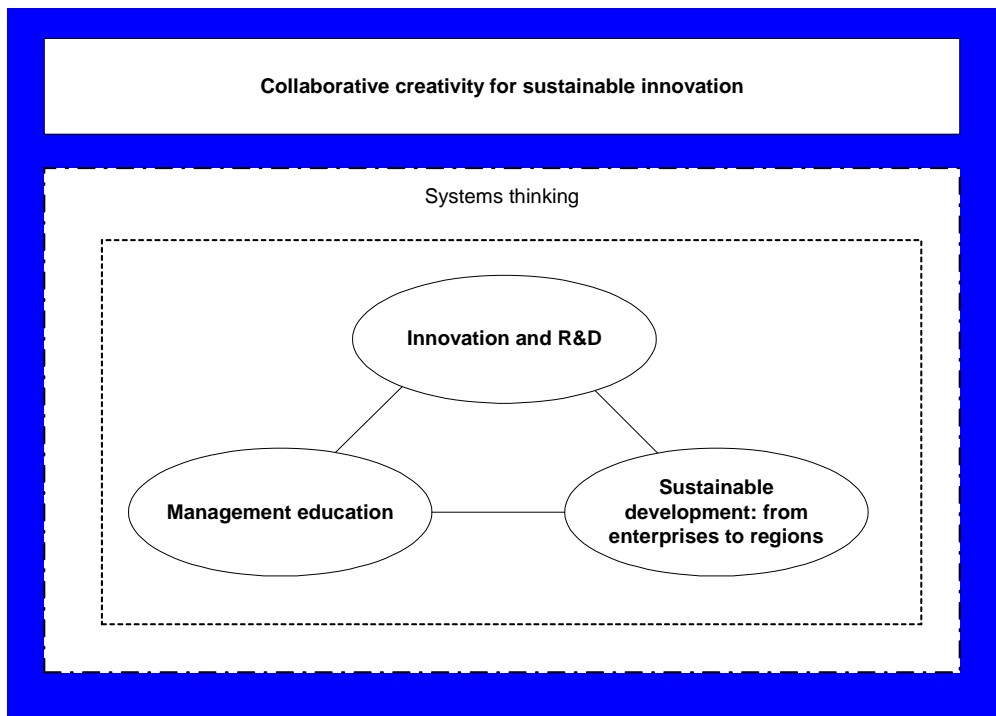


Figure 1: Inherent coherence of the habilitation treatise

The broad range of this research perspective includes enterprises and regions as well. Creativity and innovation not only shape enterprises, but also regions. Therefore, a mutual transfer of knowledge and experiences needs to be synthesized and opens a wide field of research opportunities. Further, the real-world focus and the complexity of this topic consequently call for an inter- and transdisciplinary approach. Although often claimed to be integrated into research, specific settings are required such as the new Faculty of Environmental, Regional and Educational Sciences (URBI) at the University of Graz which

provides goal-based cooperation and networking as key facilitators. Additionally, innovation and sustainable development depend on educational means that also need to be based on inter- and transdisciplinarity.

What are the peculiarities of those three thematic modules?

- The first module “**Innovation and Research & Development (R & D)**” starts with a paper on “*Innovation as a two-sided coin with special consideration of analogies*” and a paper on “*Innovation and creativity from the viewpoint of systems thinking and chaos theory.*” Based on Schumpeter’s definition of innovation as creative destruction, a systems thinking perspective also calls for a realization of both sides of the “innovation coin”, its positive and negative sides, its constructive and destructive ones. Furthermore, since innovation systems and collaborative creative problem-solving processes usually show high complexity, creativity as the basis for innovation is discussed regarding its chaotic patterns of behavior.

The second part of this module introduces a conceptual framework for collaborative creativity based on the “Planetary Model”. The paper “*The Planetary Model as an organizational framework for the generation of innovation. A critical reflection on today’s innovation practice*” critically reflects on science, questions the phenomenon of morphic fields with regard to creativity and builds a first basis for the Planetary Model’s further development in the paper “*The concept of Open Creativity: collaborative creative problem solving for innovation generation - a systems approach.*” The importance of creativity as a prerequisite for innovation is pointed out. Further, creativity and innovation are not only means for themselves but can significantly contribute to sustainable development. Hence, complex open creativity systems (and open innovation systems) need to make use of the system’s internal and external creative potentials as well and require problem-solving strategies based on creativity, interdisciplinarity and transdisciplinarity. Hereby, the multilevel aspects of collaborative creativity (from the individual to groups, organizations, networks, and regions) are pointed out and its implementation within the innovation process is outlined.

An article on “*Supporting sustainable innovation through stakeholder management: a systems view*” points out the importance of appropriate stakeholder consideration and integration for the development of sustainable innovation. The conceptualization of a stakeholder management scheme portrays the need for sufficient identification, analysis, and classification of stakeholders and for a comprehensive action plan. The stakeholder management system applied in the case of the City of Graz, was subjected to a comprehensive statistical analysis of stakeholder preferences, involving examination of a stratified sample of 200 participants.

The module is finalized with two practical applications. The paper “*How to support the enterprise’s capability to generate radical innovation: what can be learned from the*

U.S.'s most innovative company IDEO?” is a case investigation of one of the U.S.’ most innovative companies and illustrates that specific thinking modes and methodologies are of relevance for the generation of radical innovations. These modes and methodologies are different from those applied within the generation of incremental innovation: the higher the degree of complexity of the innovation task, the more important the synergetic interaction between convergent and divergent thinking becomes.

The contribution “*ERP-Innovationsgenerierung*” is about the implications of ERP-systems and portals on the innovation capabilities of an enterprise. Barriers and limits of those systems are discussed here as well.

- The second module “**Sustainable Development: from Enterprises and Regions**” consists of the paper “*Transdisciplinary change processes and transdisciplinary research for a sustainable future: the role of Regional Centres of Expertise on education for sustainable development (RCEs)*” and the paper “*RCE Graz-Styria – a process of mobilization facing regional challenges.*” Within the first paper the implications are broadened from an enterprise perspective to a regional perspective. It is discussed how Regional Centres of Expertise on education for sustainable development (RCEs), initiated by the United Nations, can support sustainability education and communication for a sustainable future, as well as transdisciplinary change and research processes in general. Based on a brief discussion of the peculiarities of today’s change phenomenon, the peculiarities of transdisciplinary change processes and transdisciplinary research and the needs for research into appropriate forms of communication based on stakeholder considerations are pointed out. Furthermore, RCEs are introduced as a powerful means for guiding such transdisciplinary processes by establishing mutual knowledge exchange between institutions of higher education/academics and society. An analysis of 34 contemporary RCEs worldwide with regard to some basic system parameters and the Austrian case of the RCE Graz-Styria with a case on the development of an ecovillage finalizes this paper. The purpose of the second paper is to present how the RCE Graz-Styria as well as RCEs in general can contribute to regional development and how they are about to constitute a ‘Global Learning Space for Sustainable Development’. Hereby, it is shown that RCEs can contribute to a sustainable regional development by creating creative (innovation) milieus and learning regions and by building up stakeholder networks in the field of sustainable development.
- The third module “**Management Education**” is composed of three papers that are first “*How appropriate are famous concepts from higher education for solving complex real-world problems? A comparison of the Harvard and the ETH case study approach*”,

second “*Higher education for sustainability by means of transdisciplinary case studies: an innovative approach for solving complex, real-world problems*” and third “*Integrating research and teaching on innovation for sustainable development.*” This module stresses that most traditional unidirectional educational processes are only of very limited use when preparing students in dealing with complex real-world problems. Purely analytically based solutions are not available; a dynamic mutual learning process characterized by self-responsibility, joint problem-solving between science and society, together with the alliance of analytical and creative capabilities is required instead. The interplay between academics/science with society and the call for more appropriate educational means to make trainees and students fit for dealing with complex real-world problems by a transdisciplinary case study approach is crucial. Hereby, the basis is built by a comparison of various case-study approaches. The Harvard approach takes students away from purely theory-based studying and understanding, in which written cases confront students with practical problems that have been extensively investigated by a researcher and documented with the objective to make this practical problem accessible to a great number of students within the classroom. In this contribution it is argued that the Harvard case study approach is a very sensible first step towards bridging the gap between the academic and the practical world but it is not appropriate for training students or other actors in coping with complex real-world problems. Comparatively, the ETH case study approach goes much further by exposing the students to real-world problems which are multi-faceted and complex. A combination of both the Harvard and the ETH approach becomes of interest.

It is shown that the implementation of inter- and transdisciplinary case studies (ETH case study approach) is one effective way of breaking through existing conventional structures and processes. With this kind of case study, research and teaching activities can be integrated in a way that leads to a self-regulated mutual learning process between the actors concerned. Students, researchers and practitioners from the case work together closely in order to find an appropriate answer to the leading question of the case study, i.e. how innovation can contribute to the sustainable development of society within a certain region or organization. Two Austrian case studies on inter- and transdisciplinary case studies finalize this module.