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Universities as facilitators of sustainable regional development: The role of knowledge, leadership and governance

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Abstract

The question of how universities do stimulate regional economic development is mainly inquired in studies focusing on innovation and entrepreneurship. In these studies universities are seen as important actors within regional innovation systems (RIS). Within these RIS universities fulfill besides their training and education (human capital) function a knowledge production and transfer function. Studies on sustainable regional development are additionally focusing more and more on governance issues and the role of different stakeholders within governance networks and their ability to contribute to a more sustainable development at the regional level. Universities are important governance stakeholders, since their administrators and faculty members are eligible partners for regional governments. Here it is mainly their research capacity which is often used for expertise, e.g. to contribute to regional economic development plans.

The role of institutions in fostering sustainable development at the regional level gained, especially in Europe, major importance since multi-level governance (MLG) is the number one concept in the European Union regional policy. The focus on institutional cooperation and how this network cooperation leads to a more effective implementation of sustainable development is the subject of several research agendas focusing on governance for sustainable development. There is a lack of knowledge and expertise with respect to the links between certain institutions and the broader society, and hence their ability to foster sustainable regional development. In this regard universities can serve as facilitators between societal and other institutional actors. In order to fill this gap the question of how the sustainable policy implementation process could be supported by universities acting in partnership with other institutional actors will be addressed. We will introduce an analytical framework which would allow us to test hypotheses extracted out of existing theoretical and empirical literature about universities as key actors in advancing

sustainable development. The goal is to filter both factors enhancing sustainable development and obstacles and barriers that are hindering sustainable development.

Keywords: governance for sustainable development, universities, regions

1 Introduction

The role of education in fostering sustainable development was on the agenda of the 2nd World Summit on Sustainable Development in Johannesburg 2002. Participants agreed there “that education has the potential to play a major role in the future realization of a vision of sustainability that links economic well-being with respect for cultural diversity, the Earth and its resources” (UNESCO 2007, p. 6). With respect to this the UN General Assembly adopted resolution 57/254 and declared the period 2005-2014 as the ‘Decade for Education for Sustainable Development (DESD)’ (see Little and Green 2009, p. 171f.; UNESCO 2009, p.4). This is the reason for an increasing concentration of activities of different educational institutions covering all forms of education and learning as well as a growing body of literature dealing with this issue.

Fact is that educational institutions at all levels have the potential to provide specific knowledge which will be transformed to societal skills. This includes kindergartens, schools at all levels, higher education institutions (HEIs) and further education institutions. Since HEIs operate in regional, national and international networks (Ferlie et al. 2008) they are important stakeholders for multi-level implementation of sustainable development. Their role in the surrounding region is somehow often underestimated although especially universities are intensively cooperating especially with firms located in the same region and are insofar contributing directly to the regions’ performance. Regions with a higher proportion of innovative firms are increasingly interested in linking these firms with other important stakeholders acting in the same regional innovation system (RIS). Such a stakeholder oriented regional strategy is often more open to see universities as important actors for regional development and allows them to delegate “faculty and administrators to regional government boards” (Goldstein 2009, p. 22). In such a setting universities become important governance actors as they provide their expertise and specific know-how and contribute to regional development. Additionally, the question of strengthening the institutional framework for sustainable development was on the agenda of the World Summit on Sustainable Development in Johannesburg in 2002 (see United Nations University 2010). This increased role of academic knowledge transfer is an important factor that “drives universities to multi-task organizations which are in need of new governance structures” (Geuna

and Muscio 2009, p. 94). Their contribution to regional development can be interpreted as an increased scale and complexity of the universities' activities.

According to the above mentioned issues, universities have a great influence on society in a two-fold manner. They train and educate people, and they are governance actors at the national and regional level. In both functions they actively contribute to social capital in their respective regions.

The focus on institutional cooperation and how this network cooperation leads to a more effective implementation of sustainable development is the subject of several research agendas focusing on governance for sustainable development. There is a lack of knowledge and expertise with respect to the links between certain institutions and the broader society, and hence their ability to foster sustainable development. In this regard universities can serve as facilitators between societal and other institutional actors. This paper concentrates on universities and identifies their actual and potential roles in fulfilling educational functions, governance and economic development functions, and facilitative and mediating functions all to enhance sustainable development.

The paper is organized along four sections. Section 2 provides the theoretical background and discusses the different functions of universities. In section 3 we closely examine the focus of sustainable development and determine the potential of universities to contribute actively to sustainability. This section introduces an analytical framework which helps to test the hypotheses based on the literature. The final section summarizes the main findings and presents an outlook for further research.

2 Universities and their different functions

As stated at the very beginning of this article, universities fulfil different functions which affect society directly. There are three main functions, education, research and governance which will be highlighted in the following in more detail since they directly affect the universities' ability and potential of fostering sustainable development at the regional level. Via these functions universities contribute to human capital, social capital and economic development in particular regions (see Figure 1).

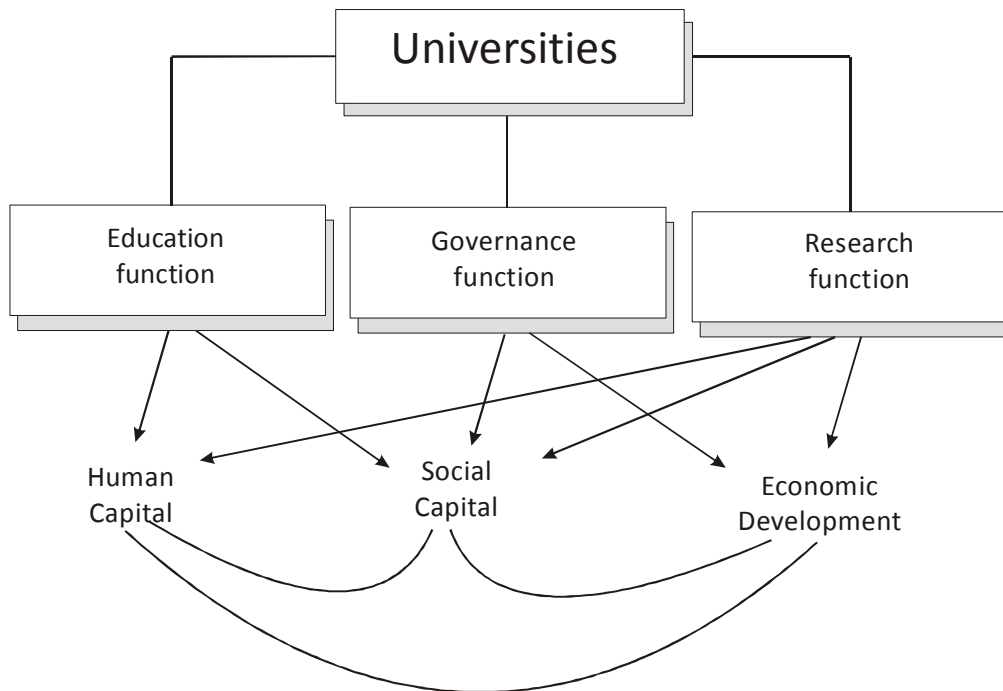


Figure 1 Universities and their functions (Source: own concept)

Education

Education incorporates two different roles an individual role and a societal role. As individual role the increase of one's knowledge levels can be understood whereas the societal role is defined via the institutional role of transferring knowledge to future citizens (Marton 2006).

Within the education sector universities are training and education facilities which serve as pools of human capital. They create human capital insofar as they educate the future workforce and endow employees with specific skills. But in many cases skilled workforce does not remain in the regional labour market which makes it hard to assign a direct human capital effect in the region where the university is located (Goldstein 2009).

Education has changed in terms of teaching methods and the proportion of students within universities over the past decades. A general trend of an ongoing rise of mass education (Geuna and Muscio 2009, Bleiklie and Kogan 2007) has completely changed the situation of HEIs in terms of their visibility and their costs. Consequently education has become more and more a global public good (see Marginson 2004) and universities and other HEIs are competing

internationally. This makes it relatively hard to assess universities' regional economic development impact.

Academic education cannot be completely separated from research since both are complements. Therefore an understanding of a modern university implies an interlinkage between teaching and research which serves the overall goal of professional education (Gläser and Lange 2007, p. 443). These interlinkages guarantee a high proportion of prevailing and highly relevant topics in teaching and research. Furthermore, universities often opt for a clear distinction between undergraduate and postgraduate education which can be understood as "specific strategic educational profiles" (Bonaccorsi and Daraio 2007, p.55) which is often complemented by a specialisation of disciplines.

Besides the traditional educational role, universities are more and more becoming social learning institutions since they serve the societies' needs. According to Wals and van der Leij (2007) "social learning takes place when divergent interests, norms, values and constructions of reality meet in an environment that is conducive to learning" (p. 18). Since social learning becomes more and more an important strategic element within the context of sustainable development and environmental management (see Keen et al. 2005) universities are important bridging institutions between government and society. The bridging function can be observed in many cases, since universities offer services which are open to the public and can therefore provide benefits to different members of society. Such activities cover a broad variety of different events like for instance public talks, discussion rounds, slide shows or 'kids university' ("*Kinderuniversität*") which address different stakeholders and bring them together in an atmosphere of mutual learning and sharing. Furthermore, the visibility of academic knowledge increases through promotional activities via traditional and new media channels.

Research

The research function includes knowledge production as well as knowledge transfer. University research produces knowledge that can be directly used by other stakeholders at different spatial levels. Especially the local and regional multiplier effects of universities can be measured in productivity and innovativeness of firms and other organizations (Goldstein 2009, p. 19) and

induce regional economic development. This becomes more and more relevant since knowledge gains a growing role in the production process of firms. Geuna and Muscio (2009) argue that there is a specific need of governance of university knowledge transfer which is one particular aspect of a starting transformation process within universities. Knowledge transfer has become a strategic issue and covers various direct (i.e. collaborative research projects, intellectual property rights and spin offs, labour and student mobility, consultancy, etc.) as well as indirect or 'soft' activities (i.e. attendance at conferences, creation of electronic networks, etc.). Knowledge transfer can happen in different forms via specific research centres or individual faculty who serve as consultants (Goldstein 2009, p. 20). Geuna and Muscio (2009) provide an overview of different models of academic knowledge transfer (p. 96f.):

- Old model: "Within that model governance was shaped by personal relationships between academic researchers, industry and government."
- New model: "Universities become responsible via knowledge transfer organizations (KTOs) or other bridging institutions for knowledge transfer activities and the consequent processes of monitoring, centralization and attempts to manage these activities more efficiently."

The new model shows a higher degree of institutionalisation and is documented in a more precise way since these knowledge transfer organizations have a clear mission and need to fulfil certain goals which are based on interaction with other organisational stakeholders. The old model is mainly based on informal and individual contacts.

Because of the knowledge production and transfer function, universities are identified as drivers for regional economic development and as Geuna and Muscio (2009) pointed out university research as a whole is seen as being able to promote local knowledge spillovers (Breschi and Lissoni 2001, Feldman and Desrochers 2003) and lead to regional innovation processes (Jaffe 1989, Varga 1998). They argue that universities have shifted their orientation in a more market-oriented direction which leads to an increased competition between universities and other public and private research institutions. In parallel, the discussion about the proportion between basic and applied research becomes an important issue within universities. There are critical voices which claim that the university-industry linkages are enhancing the fraction of applied research.

Fact is that many governments are in favour of promoting university-industry collaborations and support the creation of bridging institutions (Geuna and Muscio 2009) with the aim of building up localized innovation systems. There are some crucial arguments existing in the literature which scrutinize the impact of local universities and public research institutions on firms' innovative activities (see Breschi and Lissoni 2001, p. 1000). Therefore some scholars (Feldman and Desrochers 2003, Varga 2009) argue that there are a lot of co-existing factors affecting the transmission of university knowledge spillovers. They identified some factors like a university's founding mission, its institutional context, prior experiences with industry collaborations (Feldman and Desrochers 2003, p. 5), social networks of inventors, cultural differences (Saxenian 1994), the level of entrepreneurship (Acs and Varga 2005, Goldstein 2010) and agglomeration effects (Feldman 1994, Goldstein and Drucker 2006).

Governance

As argued above, university faculty and administrators are important actors for regional development processes as they provide their expertise and contribute to economic and human well-being (Goldstein 2009, p 22f.). Since the scale and complexity of the universities' activities has increased there is a growing need for an improved governance system that can cope with these complexities (Geuna and Muscio 2009). Besides the internal institutional set-up which helps the university to generate new knowledge and contribute to economic development, the external institutional set-up needs to be investigated. This external focus concentrates on the relationship between government, universities and firms which Etzkowitz and Leydesdorff (1998, 2000) defined as the "triple helix". Interactions and interdependencies within this triple helix can be "enhanced through the ability of individuals to circulate from one sphere to another" (Etzkowitz and Dzisah 2008, p. 653). On the one hand universities are sometimes seen as the linking or bridging element between "the state as a single provider of knowledge as a public good, and the corporation as the appropriate institution for the provision of knowledge as a quasi-proprietary good" (Antonelli 2008, p.2). On the other hand universities are facing increased political pressure to raise research funding from industry and contribute actively to economic development (Geuna and Muscio 2009).

Looking into the public policy literature, some authors argue that the higher education sector is often seen as a “stand alone sector which is not directly or easily comparable with other types of organisations, even within the public sector” (Ferlie et al. 2008 p. 326). Here education and research are considered as public goods. Consequently, the state achieves more or less two goals within higher education public policy. The first is “to ensure the autonomy of higher education” and the second is “to mediate the interests of the society and orienting the development of higher education” (Ferlie et al. 2008, p. 327). The public sector as a whole has experienced a lot of changes over the past decades, since management and governance have become the new paradigms (see e.g. Rhodes 2003, Kjaer 2004, OECD 2003, Marton 2006). This induced institutional changes in a way that the nation state loses functions, legitimacy and authority. Especially, because the higher education sector operates in regional, national and international networks simultaneously, adequate institutional mechanisms dealing with the different stakeholder profiles are required.

One stream within the higher education system literature is dealing with democratic revitalisation (Mayntz 2002, Ferlie et al. 2008) which suggests strong participation between faculty, staff, students and other stakeholders. Here we are talking about a shift from universities as a “republic of scholars” to universities as “stakeholder organizations” (Bleiklie and Kogan 2007, p. 477). This was a strong trend within Europe, where during the university reforms many European countries (the pioneer countries were Germany, the Netherlands, and Norway) passed new laws and created university boards comprising both university members and non-university members (Mayntz 2002). As Renate Mayntz (2002) pointed out university boards have more ‘identities’. Firstly, they function like “control organs with the clear aim of enhancing efficiency in the university management”. This is often interpreted as a weakened position and a replacement of collegial structures by these stakeholder boards (Bleiklie and Kogan 2007, p. 480). Secondly, they are providers for an “increased autonomy of universities vis-à-vis the state bureaucracy” (Mayntz 2002, p. 27). Other countries like the “United Kingdom invited non-academic members in their national research councils” (Ferlie et al. p. 334). Such a democratising shift has the potential to emphasize the university – society link in form of intensive interactions with local and regional stakeholders. Such a shift is discussed in the literature as a transition of knowledge production processes from “Mode 1” towards a more context-driven and interdisciplinary “Mode 2” knowledge production (Gibbons et al. 1994). Within this new orientation transdisciplinary

research (Russell et al. 2008, Thomson Klein 2004) becomes more important and participation is added as a further element (Pohl 2008). The “Mode 2” knowledge production corresponds with the network based forms of public management (Kickert et al. 1997) and governance networks (Rhodes 2003, Rhodes 2008).

The rising importance of public management within universities has changed their organisation and their management tremendously and brought up a debate about organisation and leadership in higher education which is a central part of the “triple helix”. In the course of these changes universities started to form coalitions or alliances but with different actor constellations and interests. Bleiklie and Kogan (2007) refer that there are “different trajectories co-existing which higher education systems are following” (p. 487). They provide an overview of different trajectories in European countries which shows different institutional environments.

3 Universities as facilitators of sustainable development at the regional level

As pointed out at the beginning of this article the role of education in fostering sustainable development is internationally recognized and gained major importance since the Johannesburg Sustainable Development World Summit in 2002. The idea of the decade for education for sustainable development is based on a “new vision of education that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future” (see United Nations University 2010). Empowerment and participation are the key-elements within this vision. Since empowerment of citizens and their active participation in regional processes are often hard to activate, the question of putting these conceptual ideas into practice seems to be of major importance. In the following subsection we will focus on the institutional aspects of these worldwide activities and introduce the idea of a concept of the “Global Learning Space for Sustainable Development”, which is based on a network of Regional Centres of Expertise (see United Nations University 2010).

3.1 Regional Centres of Expertise (RCEs)

In the course of putting the role of education in fostering sustainable development into practise so-called Regional Centres of Expertise (RCEs) were proposed, which are defined as networks or platforms consisting of existing educational institutions at the regional level. In a pilot phase which started in 2005 seven RCEs were launched. The single RCEs form the basis of a

worldwide RCE network which consists now of 74 RCEs (see United Nations University 2010). Each RCE covers the following four elements – governance, collaboration, research and development and transformative education. In order to deal with these elements the participating institutions need to fulfil specific functions within these RCE networks, and in many cases universities are the key-institutions (see United Nations University 2010). The overall mission of these RCEs is to deliver education for sustainable development to local and regional communities, which is a clear regional development role (Mader et al. 2008, Mochizuki and Fadeeva 2008). Within the RCEs knowledge is not only understood as ‘scientific’ knowledge, it includes also “valuable knowledge of non-profit organizations (NGOs), civil society organizations and other non-formal education actors” (Mochizuki and Fadeeva 2008, p. 372). Since the overall aim is to raise awareness for sustainable development among society and educational institutions the mobilization of as many actors as possible for multi-stakeholder dialogues is a prime target (Mader et al. 2008, p. 403). The RCEs are following a social learning model which can be understood as “the creation of new knowledge through active, contextually grounded learning” (Mochizuki and Fadeeva 2008, p. 376) which “takes place when divergent interests, norms, values and constructions of reality meet in an environment that is conducive to learning” (Wals and van der Leij 2007, p. 18).

The importance of higher education institutions within the RCEs is assessed relatively high since they are seen as “institutions that have a social responsibility and moral obligation (derived from academic freedom and autonomy) to address sustainability challenges” and as “institutions with stable human and financial resources” (Mochizuki and Fadeeva 2008, p. 373). As elaborated in the previous section about the research function of universities, they are knowledge generating and transferring institutions. In the context of sustainable development this role is enlarged to a “socialising agent role” and a “knowledge transmitter role” (Mochizuki and Fadeeva 2008, p. 377). UNESCO (2007) defined two ways of fulfilling this knowledge creation and transferring role in the area of sustainable development:

1. Through preparation of future decision makers and teachers.
2. Through outreach and service to society.

The example of the Regional Centres of Expertise shows that educational institutions are putting the idea of regional sustainability into practice. In the following two sections we will elaborate a framework for analysing such initiatives.

3.2 Universities as facilitators between societal and other institutional actors

In section 2 we have discussed the different roles of universities which are defined through their main functions of education, research and governance. The arguments derived from the literature will now be used to define a fourth function which is especially important in the course of implementing sustainable development at the regional level. Therefore we will start with the main hypotheses for the three established functions which are forming the basis for the fourth function – the facilitative and mediating function.

Education

As pointed out earlier the education function consists of two major roles – the individual and the societal role. These two roles are based on existing linkages between education, participation and learning outcomes which affect both individual and social learning (Sinclair et al. 2008, p. 424).

Hypothesis 1: Universities fulfil a central role in sustainable development processes since they are key-players in both the individual as well as the social or collective learning systems.

It is the linkage between these learning systems which allows combining academic as well as non-academic and formal as well as non-formal knowledge. The translation process between the different types of knowledge needs a specific institutional set-up which can be found in universities.

Hypothesis 2: Academic freedom and the influence on society are the core factors that make universities highly responsible for sustainable development and empower them to key-drivers for its implementation.

Academic freedom enables universities to explore ideas which are especially in a comprehensive or integrative sustainability approach important to coping with the trade off's between economic, social and environmental goals. As Sibbel (2009) pointed out, especially “tertiary students represent a population with the intellectual capability to assimilate the many dimensions of the concept of sustainability” (p. 74). Within universities the constellation of different stakeholders such as students, academics and administrators, with their diverse attitudes, skills, knowledge and experiences form a multi-stakeholder organization with perfect prerequisites for sustainable

development implementation. This enables them to cope with the mix of stakeholders outside the university.

Hypothesis 3: The development of curricula dealing with certain components of sustainable development fosters public awareness and helps to develop ideas and creative solutions.

The introduction of sustainability degree programs is on the one hand a clear signal for providing sustainability expertise and should on the other hand be derived directly from the needs of the society that it serves. This signal can be understood as a stimulus directed to society as a whole, to the responsible actors at the regional level and to other public or private institutional actors.

Research

The research function incorporates knowledge production and knowledge transfer. Especially via the knowledge transfer function universities are linked to other institutional environments.

Hypothesis 4: Knowledge transfer activities of the modern style enable universities to cope with the need for a mixture of basic and applied research and the need for multi- and transdisciplinary research.

The implementation of sustainable strategies requires a changed understanding of knowledge creation and its transfer. Universities produce specialised knowledge and expertise which is problem solving oriented. Within the new channels of knowledge transfer it becomes easier to complement this specialised academic knowledge with a more practical knowledge.

Hypothesis 5: The transition of the knowledge production process from “MODE 1” to “MODE 2” has a strong influence on the type of research agendas which were originally defined by academics and are now defined in a multi-stakeholder environment in order to solve multidisciplinary societal needs and problems.

The discussion of transdisciplinarity comes up especially within the implementation process of sustainable development. The potential of non-academic stakeholders in integrating particular knowledge becomes extremely important at the regional level. Combining academic expertise with practical skills is one of the big advantages in transdisciplinary research agendas.

Governance

The governance function of universities has an internal as well as external component. The changes of the internal institutional set-up in the form of organisational and managerial reforms as a consequence of the general public sector reform have strongly influenced the universities' missions which is partly defined via their economic development role.

Hypothesis 6: Since universities operate in regional, national and international networks simultaneously in collaboration with a wide range of different stakeholder groups, they are qualified for multi-level implementation of sustainable development.

Although universities are working at these different levels the question of how they could deal with the complex interactions comes up. As worked out before universities are in general educational and knowledge creation facilities which are used to collaborate with students, scholars, and in the concern of research, often with firms and other institutions. Within their new roles as regional development players they have to cope with new challenges like incorporating new steering mechanisms. An analysis of universities' steering capacity would be a central part of identifying their facilitative and mediating function.

Hypothesis 7: Since universities are multi-stakeholder organisations they can access a mixture of knowledge and expertise which is a prerequisite for finding solutions in inter- and transdisciplinary settings.

In the context of activating the interdisciplinary potential of universities the question of coordination and internal power constellations comes up and needs to be investigated in further detail. In the course of the organisational and managerial reforms, universities have experienced a lot of institutional changes during the past couple of years. These changes caused structural adaptation processes which demanded changes at the actors' as well as at the departmental level. In order to cope with such multidisciplinary settings a highly cooperative 'milieu' as well as efficient information and knowledge management procedures within universities is needed.

3.3 A framework for identifying and analysing universities as facilitators for sustainable development implementation processes at the regional level

The previous sections of this paper have presented a picture of the most essential functions of universities which enables them to fulfil a facilitative and mediating role to enhance sustainable

development. The hypotheses presented in section 3.2 form the basis for the following framework for analysing universities as facilitators for sustainable development (see Table 1).

We see the three functions as the core dimensions of such a framework since they cover the main goals and purposes of universities as regional stakeholders. Therefore we have structured the framework along the three functions.

Education as the core competence of universities gives an insight into the assumed key-player role in individual and societal learning systems. This key-role can be identified via their human and social capital impact which depends on several factors like e.g. size of the region, 'culture' of the region, economic structure, etc. In order to fulfil this key-role, universities need to define their sustainable development approach within their teaching competence. If they have incorporated sustainable development in their mission and goals, universities have the potential to raise awareness for sustainable development among students since they are the linking element to the future generation and as mentioned earlier they represent a population with the intellectual capability to assimilate the different dimensions of sustainability. There are many elements and factors co-existing to analyse this awareness component, like specific curricula, active participation of students, etc.

For their societal learning function universities need to be highlighted along different dimensions – internally and externally. Internal instruments are teaching methods and tailor-made bridging services as discussed earlier in this paper. The latter are extremely important since they translate academic knowledge into non-academic knowledge.

Function	Questions	Analysis
<p>Education</p> <p>-----</p> <p><i>Individual</i></p> <p>-----</p> <p>-</p> <p><i>Societal</i></p>	<p>Why are universities key-players in individual and societal learning systems?</p> <p>How do universities define their sustainable development approach?</p> <p>-----</p> <p>How can universities raise awareness of sustainable development among students?</p> <p>-----</p> <p>How does academic freedom enable universities to contribute to a comprehensive sustainability approach?</p> <p>-----</p> <p>How can universities foster sustainability awareness in the public?</p>	<p>- Human capital impact - Social capital impact</p> <p>- Mission and goals versus activities</p> <p>-----</p> <p>-Curricula focusing on sustainable development -Partnerships between students, faculty, administration -Student grass root initiatives -Internal creative ‘milieu’ and learning environment</p> <p>-----</p> <p>-Teaching methods -Bridging services</p> <p>-----</p> <p>-Sustainability degree programs -Extra-curricular activities -Level of participation in the region</p>
<p>Research</p> <p>-----</p> <p><i>Knowledge creation</i></p> <p>-----</p> <p><i>Knowledge transfer</i></p>	<p>How integrated is sustainable development in the general research agenda?</p> <p>-----</p> <p>-</p> <p>What are the most important stimuli for research?</p> <p>-----</p> <p>How can knowledge transfer activities contribute to sustainable development at the regional level?</p>	<p>-Mission -Research strategy</p> <p>-----</p> <p>-Cooperation partners -Communication structure between other institutional stakeholders and universities -Proportion of public and private grants</p> <p>-----</p> <p>-Proportion of applied research -Proportion of multi- and transdisciplinary research -Translation process of academic knowledge -Collaboration and cooperation constellations (→network building)</p>

Governance	How does the growing importance of governance and management affect the universities' profiles?	-Autonomy versus external steering
----- -	-----	-----
<i>Internal</i>	What kinds of steering mechanisms are needed to activate cooperation in universities?	-Organisational structures -Internal partnerships (level of participation between faculty, staff and students) -Steering capacity
-----	-----	-----
<i>External</i>	How can universities handle multi-stakeholder processes?	- -External partnerships (→'triple helix')

Table 1 Analytical framework

Concerning research universities often implement sustainable development in their general and overall research agenda. This goes hand in hand with integrating sustainable development into their mission. Concerning knowledge production the question of how research is stimulated needs to be addressed. It makes a big difference if sustainable related research is encouraged by public authorities or by private institutions. If it is part of a regional development strategy, governmental institutions will be the main drivers for initiating research, here we will find policy induced research patterns. Whereas market induced sustainability research follows different patterns. The analysis of these different research patterns helps to understand the stimulus – response chain between universities and other institutional actors. In both cases the mixture of cooperation partners and the communication structure between them seem to be the essential factors that need to be highlighted. The focus on knowledge transfer and its linkage to sustainability sheds a light on the proportion of applied research since this type of research induces a more multi- and transdisciplinary setting. Within such multi- and transdisciplinary settings the collaboration and cooperation constellations can be analysed in further detail which will lead us to a network analysis.

Governance seems to be the most complex function since we need to distinguish between internal and external governance processes. Universities have experienced a massive change since managerial approaches and governance became the new paradigms for their organisation. The shift from more or less policy dependent public institutions to autonomous, often private

organisations offered new challenges. This spectrum between autonomy and external steering seems to be one of the most important aspects within a sustainable governance analysis. The internal governance processes are challenged by the need of implementing a new steering mechanism aiming at a more cooperative environment within universities. In order to find out whether universities have such a new steering capacity, the overall organisational structure needs to be highlighted in detail. On the actors' level internal partnerships seem to be an essential indicator for analysing this steering capacity. The overall question within the external governance focus is related to the experts' role of university faculty and staff within the regional development process. If university personnel is part of regional boards and working groups then the question of how these external partnerships are organised needs to be addressed. The potential of facilitating and mediating within such processes depends on different factors. The ability of translating academic expertise into practical terms and vice versa translating ideas and practical knowledge into academic terms seems to be one of the more important ones. But there are other relevant aspects and factors like bargaining and negotiating positions of single actors, political pressure, market forces, etc. which need to be addressed here.

4 Summary and outlook

The paper focuses on the potential of universities to contribute actively to sustainable development processes at the regional level. This implies a detailed focus on their different co-existing core functions. The growing body of literature about the higher education sector in general and universities specifically show a broad variety of important functions of such educational institutions. These functions legitimate universities as drivers of regional economic development. Especially the governance and research functions seem to be broadly accepted as being supportive of regional economic processes. If universities have this potential of actively contributing to economic development they could use their role for facilitating sustainable development. For such a facilitating and mediating role the educational function enables universities to activate the missing link to society. Universities have the potential to operate as facilitators between societal and other institutional actors which distinguish them from other important economic development actors.

The analytical framework developed here is designed as a first step for further analyses which would allow us to test a presented set of hypotheses based upon the existing theoretical and

empirical literature. In the course of the discussion we shall identify a set of obstacles and barriers that are hindering the sustainable policy implementation process at the regional level. There are some existing studies about the earlier presented Regional Centres of Expertise which identify obstacles that affect the efficiency and effectiveness of higher education institutions in achieving sustainable development (Mochizuki and Fadeeva 2007, p. 377):

- “Lack of public awareness
- Lack of general understanding of sustainable development principles and processes by local elected officials, staff and other stakeholders in the region
- Traditional institutional structures which are too vertically segmented and compartmentalized for the cross-cutting and holistic nature of sustainable development.”

The existing sample of 74 Regional Centres of Expertise could be used as a starting point for an international comprehensive analysis since they already fulfil a facilitative and mediating role to enhance sustainable development at the regional level.

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