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Getting an empirical hold of the sustainable university: a comparative analysis of evaluation frameworks across 12 contemporary sustainability assessment tools.

Although it is increasingly recognized that higher education institutions have to play a critical role in the progression towards a sustainable development, the question of what fields and issues universities should attend to in their attempt to become more sustainable universities remains subject to a controversial debate. In recent years sustainability assessment tools have begun to play a prominent role in strategies to reorient higher education institutions systematically and holistically toward sustainability. In the course of their further advancement, sustainability assessment tools have not only become instrumental facilitators of change processes towards sustainability, but also established implicit normative standards by framing the overall understanding of what fields and issues a sustainable university should engage with. So far, researchers in the field have paid little attention to the understandings of a sustainable university that are underpinning and informing sustainability assessment tools. This paper addresses this gap. Based on a comparative analysis of indicators and criteria as well as introductory passages in supporting documents of 12 sustainability assessment tools, the authors sketch the dominance and marginalization of different fields and issues of a sustainable university in contemporary sustainability assessment tools. In doing so, the paper contributes to building the capacity for a more sophisticated and reflexive engagement with different approaches to assess and evaluate sustainability in higher education institutions.

Keywords: sustainability assessment tools; sustainable university; higher education for sustainable development; whole institution approach

Since its inception at the Rio summit in 1992, the concept of sustainable development has been closely tied to a broad reorientation of education systems worldwide. Universities and other higher education institutions (both expressions are used synonymously in this paper) were considered to play a vital role in this endeavour already in the Agenda 21. These prominent calls for a greater engagement of
universities with the concept of sustainable development echoed in a broader debate in the field. Drawing on a distinction by van Weenen (2000), this debate resembles the three three pivotal questions of why higher education institutions should engage with sustainability, what can they do about it and how can they do it. As a response to Agenda 21, a number of pioneering universities joined alliances and signed commitments aiming at the integration of sustainability in all facets of their organization (University Leaders for a Sustainable Future 1994; Copernicus Alliance 1993; a recent overview of different milestones and seminal declarations in higher education for sustainable development is provided by Michelsen (forthcoming)).

Research into the effects of these declarations leads to an ambiguous conclusion. On the one hand, declarations were found to have contributed to raising university leaders’ awareness of the idea of sustainability, its relevance to universities and the possible venture and leverage points for promoting a genuine engagement with it at university level (Wright 2002). On the other hand, there is also criticism that declarations have not been a successful approach to establish greater accountability beyond awareness raising (Bekessy et al. 2007).

According to Michelsen’s (forthcoming) account of the field, these initial responses on the level of declarations are representative of the debate’s early development phase. It was characterized by its predominant preoccupation with arguing why sustainability is an idea that higher education institutions should engage with, and with attempting to establish networks of higher education institutions committed to pioneer the transition towards more sustainable universities. This phase saw the development of activities that mainly sought to integrate sustainability into the organization’s operations and educational curricula. The following phase was more concerned with the questions of what should be developed in which ways, as well as with the challenges of
mainstreaming and upscaling Higher Education for Sustainable Development. At this point, the focus of the debate has shifted towards increasingly concerted and holistic approaches that also address the institution’s role as a societal actor and its efforts to reach out to the community more effectively (Filho 2011; Barth et al. 2014). This becomes apparent in a recent definition of a sustainable university proposed by Stephen Sterling (2013, 23):

“The sustainable university is one that through its guiding ethos, outlook and aspirations, governance, research, curriculum, community links, campus management, monitoring and modus operandi seeks explicitly to explore, develop, contribute to, embody and manifest – critically and reflexively – the kinds of values, concepts and ideas, challenges and approaches that are emerging from the growing global sustainability discourse”.

This intentionally generic understanding of a sustainable university refers to several issues that have elsewhere been elaborated more explicitly as “key characteristics” (Ferrer-Balas et al. 2008, 296), “key elements” (Lukman & Glavič 2007, 107) or “key aspects” (Sterling & Maxey 2013, 8). In the course of the debate, a growing consensus has emerged on some of these “characteristics” (Davis et al. 2003, 170) that constitute a sustainable university. Today, activities with which universities can contribute to a broader societal transition towards sustainability are commonly grouped into four core, yet interrelated functions or “general practices” (Cortese 2003, 17): education, research, operations and community engagement (Stephens et al. 2008, Figure 1). Another frequently observed distinction complements the four fields with either governance or culture as complementary field (see e.g. Yarime and Tanaka 2012; Selby 2009). In this
study, however, governance indicators and criteria are aligned directly to the respective four fields in order to avoid compound effects.

Figure 1. Core Activities of HEIs (authors’ own)

The importance of the higher education sector for the achievement of sustainable development has most recently been reaffirmed by the final outcome document of the United Nations’ (UN) Rio+20 conference and the ongoing implementation of the UN Global Action Programme on education for sustainable development that identifies the promotion of whole institution approaches as one of five key priority areas for the further advancement of ESD (United Nations 2012; United Nations Educational, Scientific and Cultural Organization 2014). In the scholarly debate, these expressions of political support are considered to foster both mainstreaming and the further differentiation of the notion of a sustainable university (Beynaghi et al. 2014).

**The emergence of sustainability assessment tools**

In the past decade, corresponding to the development of sustainability declarations of higher education institutions, sustainability assessment practices on university level
have received increasing attention (Caeiro et al. 2013). A growing number of diverse tools and methods have been developed and implemented by single institutions as well as campus alliances. These sustainability assessment tools are underpinned by different monitoring purposes, from ensuring compliance to predetermined standards to diagnosing the state of internal processes to providing data for competitive performance comparisons (Fischer 2011). In accordance with this plurality, different types of sustainability assessment tools exist for different monitoring purposes (Jenssen 2012). The first type of sustainability assessment tools has a distinct origin in the tradition of environmental management systems that involve external audits and certification mechanisms. A second type of sustainability assessment tools features rather open and unstandardised catalogues of criteria and questions to inform self-assessment processes for organizational development and learning. Yet another, third type of sustainability assessment tools aims to generate comparative data that can be aggregated into an overall performance rating for benchmarking purposes. A fourth type of sustainability assessment tools also allows for an integrative assessment of sustainability just like the third, yet avoids systematic benchmarking in favour of certification to – so the common rationale – counteract excessive competition over indicators and ease reputational concerns of participating institutions (Tappeser 2014).

The reciprocity of assessing and developing a sustainable university

From a chronological perspective, the genesis of different types of sustainability assessment tools can be understood to have developed from compliance-oriented approaches focussing solely on the domain of operations to broader, more contextual and place-based explorative approaches to systematically developed, comprehensive approaches allowing for inter-organisational certification and/or benchmarking. What becomes clear herein is that sustainability assessment tools do not just offer the
technical tools to support the implementation and evaluation of measures that actors in
higher education institutions have developed to achieve outcomes that they have agreed
on. More so, they provide a reference framework that is based on normative
assumptions about what constitutes a sustainable university. With the diversification of
different types of sustainability assessment tools, the advancement and availability of
more sophisticated sets of indicators and criteria, as well as an increasing number of
higher education institutions using sustainability assessment tools, it can be observed
that today ‘assessment systems and frameworks are increasingly influential in guiding
the activities of higher education institutions’ (Yarime and Tanaka 2012, 73). Thus, the
question of what sustainability assessment tools are addressing and assessing as
essential features of a sustainable university, is of critical importance to the further
advancement of sustainability in higher education.

**Research aims and methods**

In light of the increasing importance of sustainability assessment tools not just as an
instrumental facilitator, but also as a normative framework for higher education
institutions’ engagement with the sustainable development agenda, this study analyses
the understandings of a sustainable university that are underpinning contemporary
sustainability assessment tools. As a dataset, it analyses a total number of 12 tools (see
Table 1 for an overview).

The research is informed by and builds on two previous studies on related questions.
More than a decade ago, Shriberg (2002) provided a comparative analysis of 11
sustainability assessment tools. Shriberg’s analysis was conducted in two steps. In the
first step, the author defined criteria that an ideal sustainability assessment tool should
meet. In the second step, the sustainability assessment tools were evaluated against
these criteria. As a result, the study reports a number of ‘parameters’ representing ‘essential attributes of sustainability in higher education’ (ibid., 266f.) that all sustainability assessment tools converge on. Ten years later, Yarime and Tanaka (2012) provided a second comprehensive comparative analysis of 16 sustainability assessment tools, using both quantitative and qualitative methods. Sorting the different indicators and categories along the five fields of education, research, operations, outreach and governance, they calculated the share of indicators for these different fields for each sustainability assessment tool. In a qualitative approach, the authors combined indicators that they ‘interpreted as addressing the same content’ (ibid., 68) into clusters and reported their quantitative share across the different sustainability assessment tools under investigation.

This study provides a threefold update and extension to aforementioned works. Only 4 of the 12 sustainability assessment tools included in this study have been analysed by the aforementioned authors before (sustainability assessment tools 1, 5, 11, and 12 by Yarime and Tanaka (2012) and sustainability assessment tool 11 by Shriberg (2002). The other 8 sustainability assessment tools have not yet been analysed in the previous studies, among them recently developed tools from Colombia (sustainability assessment tool 3), Spain (sustainability assessment tool 4), Germany (sustainability assessment tool 6) and France (sustainability assessment tool 9). While previous works were more concerned with the historic evolution of sustainability assessment tools, this study focuses more closely on sustainability assessment tools in use today. Secondly, due to the study’s explicit focus on the way a sustainable university is framed and understood in sustainability assessment tools, the analysis focuses not only on the indicators and criteria of the sustainability assessment tools, but also the introductory passages in the sustainability assessment tools’ supporting documents. Thirdly, in order to achieve
greater methodological rigour, the coding of indicators and criteria in the main part of data analysis was carried out by three independent researchers.

**Methodical approach**

A mixed-method approach comprised of both qualitative and quantitative measures is applied to analyse (1) indicators and criteria, ranging from ‘hard’ quantitative indicators to ‘soft’ open questions, defined in the technical documentation of the analysed sustainability assessment tools (referred to as main analysis in the further course of this paper), and (2) descriptive and explanatory passages in the supporting documents of the sustainability assessment tools that elaborate on the notion of a sustainable university (referred to as supplementary analysis in the further course of this paper). For the main analysis, a total of 609 indicators and criteria were extracted from the assessment tools listed in Table 1. Each indicator or criterion was coded by three coders. The coding process involved both deductive and inductive approaches.

In a deductive step, every indicator or criterion was assigned by each of the three coders to one of the top-level codes operations, research, education and community outreach. This first-order coding may be understood “as a process of naming and classifying data” seeking to “link various segments of text to a particular concept” (de Wet and Erasmus 2005, 30f.). The four codes represent the aforementioned four key functions of sustainable universities that are widely accepted in the literature and thus served as a valid construct (Mayring and Brunner 2007, 677) for the deductive part of the data analysis (see Fig. 1). Intercoder agreement was measured using Krippendorff’s α (K-alpha) using ReCal 0.1 Alpha for 3+ Coders (http://dfreelon.org/recal/recal3.php). This reliability measure is preferred over others because it corrects for chance agreement among multiple coders (Poldner et al. 2012). Krippendorff (2004) considers a
coefficient index of $K$-alpha $\geq .80$ as acceptable. For the deductive part of this study, $K$-alpha was .908 which can be considered as a fully satisfactory level of intercoder reliability for three coders (Lombard et al. 2002).

In the *inductive* part of the analysis, thematic clusters were identified in a process of second-level coding (de Wet and Erasmus 2005). This step goes beyond the rather descriptive and interpretative approach in first-level coding and represents a “metacoding process” (Miles and Huberman 1994, 69) that seeks to “identify an emerging theme, configuration or explanation” (ibid.). In a first step to second-order coding, each of the three coders revisited the segments assigned to one of the four key functions and sought to identify groups of coded segments that represent more refined sub-themes in each of the four fields. These second-order codes or sub-themes were created independently by each of the three coders to increase the variance by utilizing multiple perspectives and interpretations. Eventually, in a second step to second-order coding, the second-order codes or sub-themes identified by each coder were discussed by all three coders and further grouped and combined based on their semantic familiarity where possible. In total, 105 sub-level codes were identified by the three coders. After the removal of doublets and the merging of subordinate and higher ranking codes, a total number of 17 codes remained. These are referred to as ‘thematic clusters’.

This collaborative grouping of codes required deliberation to reach consensus among the coders. It represents an approach that is referred to as “investigator triangulation” (Flick 2004) in the literature, seeking to decrease subjective bias and increase reliability in the qualitative clustering process. As a result of the deductive and inductive coding
phase, each indicator or criterion was assigned to one of the four fields and one additional thematic cluster.

The supplementary analysis was conducted using qualitative content analysis. The research interest guiding the analysis revolved around three complementary and related themes resembling what van Weenen (2000) referred to as the **why**, **how** and **what** of any engagement with sustainability: (1) how sustainability assessment tools conceptualize the relationship between higher education institutions and sustainability (**why** is sustainability an issue to address for universities?), (2) how sustainability assessment tools address their intended usage (**how** and for what reasons should universities utilize sustainability assessment tools?) and (3) how sustainability assessment tools explicitly prioritize specific aspects and issues (**what** field of actions should a sustainable university address?). The data corpus included supporting documents of the sustainability assessment tools included in this study. Importantly, text passages used in the qualitative and indicators analysed in the quantitative study stem from different sections of the sustainability assessment tools’ documentation. The focus of interest here was on the question which aspects and characteristics of a sustainable university the supporting documents of sustainability assessment tools highlight in introductory passages framing and accompanying the technical descriptions.

The analysis included 10 of the 12 sustainability assessment tools, as no respective passages could be retrieved for 2 sustainability assessment tools. The material was coded in a process similar to the coding process described in the main analysis. In a first-order approach, the introductory passages were scanned for segments relating to one of the three guiding research questions. These segments were then coded using
inductive in-vivo codes. In the following second-order approach, the variance in the entirety of codes derived in the previous step was then analysed for specific configurations (i.e. similarities and differences) – an approach that can be casually referred to as “qualitative cluster analysis” (Liebold and Trinczek 2009, 45). This step of the analysis involved deliberation to achieve a consensual typology and was thus carried out by two researchers.

Table 1. Overview of sustainability assessment tools (SATs) included in the study

<table>
<thead>
<tr>
<th>No.</th>
<th>Sustainability Assessment Tool</th>
<th>Origin</th>
<th>Bibliography</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AISHE Assessment Instrument for Sustainability in Higher Education</td>
<td>Netherlands</td>
<td>Roorda et al. 2009</td>
</tr>
<tr>
<td>2</td>
<td>AUA Alternative Universal Appraisal</td>
<td>Asia</td>
<td>ProSPER.Net 2010</td>
</tr>
<tr>
<td>4</td>
<td>CRUE Conference of Rectors of Spanish Universities</td>
<td>Spain</td>
<td>CRUE &amp; CSC 2011</td>
</tr>
<tr>
<td>5</td>
<td>CSAF Campus Sustainability Assessment Framework</td>
<td>Canada</td>
<td>Sierra Youth Coalition 2009</td>
</tr>
<tr>
<td>6</td>
<td>DUK German Commission for UNESCO</td>
<td>Germany</td>
<td>AG HS 2011</td>
</tr>
<tr>
<td>7</td>
<td>GM Green Metric</td>
<td>Indonesia</td>
<td>University of Indonesia 2013</td>
</tr>
<tr>
<td>8</td>
<td>GMID Graz Model for Integrative Development</td>
<td>Austria</td>
<td>Mader 2013</td>
</tr>
<tr>
<td>9</td>
<td>GP Green Plan</td>
<td>France</td>
<td>CdGE and CdPdU 2012</td>
</tr>
<tr>
<td>10</td>
<td>P&amp;P People &amp; Planet</td>
<td>United Kingdom</td>
<td>People and Planet 2013</td>
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<tr>
<td>11</td>
<td>SAQ Sustainability Assessment Questionnaire</td>
<td>Global</td>
<td>University Leaders for a Sustainable Future 2009</td>
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<tr>
<td>12</td>
<td>STARS Sustainability Tracking, Assessment and Rating System</td>
<td>Northern America</td>
<td>AASHE 2012</td>
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Findings

Main Analysis

The overall distribution of indicators and criteria across the four university functions representing the analysis' top-level codes reveals an extensive share of the field of operations (67 per cent), followed by the fields of education, research and community engagement with only 18 per cent, 10 per cent and 6 per cent respectively. A comparative perspective reveals some differences between the sustainability assessment tools analysed (see Fig. 2). Some sustainability assessment tools demonstrate a distinct profile in one of the four fields, e.g. sustainability assessment tools 4, 5, 7 and 10 with a proportion of around 80 per cent of indicators and criteria in the field of operations, or sustainability assessment tools 1, 2, 8 and 12 with a proportion of more than 25 per cent in the field of education. What also becomes apparent is that only 10 out of the 12 sustainability assessment tools analysed address all four fields, with an even smaller number addressing them with at least 10 per cent each (applies to sustainability assessment tools 1, 2 and 3).

Figure 2. Share of indicators and criteria on operations, research, education and community engagement in SATs (authors’ own)
A more refined picture of issues and priorities is provided by the 18 thematic clusters that resulted from a synthesis of sets of sub-codes developed inductively by three independent coders. Three thematic clusters focus on the higher education institution’s management of its human, physical and financial resources. These clusters comprise issues that traditionally fall into the remit of staff development and social policies (e.g. training, promotion, diversity management), environmental management (e.g. energy, mobility and transport, food, grounds, facilities), or financial affairs (e.g. investment, endowment). A fourth thematic cluster from the field of operations addresses procurement policies and practices.

In the field of education and student experiences, there is one distinct thematic cluster addressing formal/curricular (e.g. study programs, courses, continuing and in-service education and training) and one addressing informal/extracurricular (e.g. outdoor programs, field trips, campaigns) educational offers and activities. An additional cluster is dedicated to the methods and approaches according to which sustainability educational offers are designed (e.g. research-based or experiential learning). A fourth cluster comprises the higher education institution’s initiatives in the domain of student career counselling and promotion.

In the field of community outreach, three thematic clusters distinguish between services that the institution delivers to the community (e.g. programs on volunteer work), networks and partnerships it establishes, and its active engagement with and participation in policy-processes with non-university stakeholders within the broader community. Performance of higher education institutions in the field of research is addressed through the thematic clusters of ongoing activities (e.g. projects, publications,
also student-led research), promotion and incentive schemes at work (e.g. funds allocated to research on sustainable development) and the institution’s participation in (inter)national networks and research collaborations on sustainable development.

Finally, three thematic clusters constitute overarching fields of action. The communication cluster concentrates indicators and criteria that refer to the institution’s efforts to provide information, establish feedback systems and account for transparency to its internal and external stakeholders (e.g. events, website). The institutionalization cluster refers to overall policy and governance strategies and actions, particularly those aiming to integrate sustainability into the institutional structures (e.g. sustainability office, mission statement). Finally, the participation cluster connects indicators and criteria that deal with the question in how far participation is encouraged and enabled (e.g. support to student initiatives, consultation of stakeholders).

As the distribution of indicators and criteria by thematic clusters across the sustainability assessment tools analysed (Table 2) shows, four clusters comprise more than two thirds of all indicators and criteria: physical resource management with a share of 33 per cent, followed by institutionalization (13 per cent), human resource management (12 per cent) and formal education (8 per cent). Again, a comparative perspective provides some further refinements. While the cluster of physical resource management represents the strongest cluster in most tools, sustainability assessment tools 4, 5, 7 and 10 contain indicators and criteria of this cluster to a share of one thirds or more. sustainability assessment tools 1, 5 and 9 are the only three tools that foresee a somewhat balanced consideration of physical and human resources with five per cent or less difference between the two clusters. Another insight that can be gained from a comparison in-between is that some thematic clusters are mostly upheld by only one or
two sustainability assessment tools. Examples for these are teaching approaches (sustainability assessment tool 8), community services (sustainability assessment tools 2 and 6) and informal/extracurricular education (sustainability assessment tools 2 and 12).

Table 2. Share of indicators and criteria by thematic clusters across SATs in per cent

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**Supplementary Analysis**

The results of the qualitative content analysis will be presented for each of the sub questions.
The relationship between universities and sustainability

Only few sustainability assessment tools feature explanatory passages in their documentation that address the question how universities relate to the notion of sustainability. Among the few sustainability assessment tools that engage with this question, three lines of argument can be distinguished.

- Firstly, the ethical argument stresses the civic responsibilities of universities. Universities are referred to as public institutions and therefore have the responsibility to contribute to building healthy, sustainable communities (e.g. sustainability assessment tool 6).

- Secondly, the instrumental argument takes up this thought and emphasizes universities’ role as facilitators of sustainability. In a solution-oriented perspective, it is pointed out in several documentations (sustainability assessment tools 6, 7, 11) that universities are important for sustainable development because they are the places where the next generation of leaders need to be equipped with the knowledge, competences and values needed to be able to meet the global challenges and propose feasible solutions. Extending the focus on educating students, universities are also expected to act as change agents themselves. Two vital mechanisms are considered to play a critical role here: awareness raising and the promotion of acceptance, motivation and knowledge within the broader society on the one hand, and providing high quality research that enhances the knowledge base and leads to innovations necessary for sustainable development (sustainability assessment tool 6).

- Thirdly, the marketing argument refers to the potential of sustainability as a unique selling point for universities. Here, the focus is on the economic advantages of an institutional engagement with sustainable development that can
shape the university’s image, stimulate new cooperation with the economic sector and improve the institution’s position in the competition for funds and future students (sustainability assessment tool 9).

**Intentions and approaches**

The analysis of the documentation exposed differing accentuations with regard to the question how the sustainability assessment tool should be used and what aspects are of particular relevance. Again, three accentuations can be distinguished in the documentations, resembling the aforementioned distinction between compliance, diagnostic and performance monitoring: a first accentuation is on the role of sustainability assessment tools as *motivators* to engage in and *moderators* of a whole-institution approach to a sustainable university (e.g. sustainability assessment tool 6). Here, the focus is on assisting university actors in planning, developing, implementing and evaluating change measures (e.g. sustainability assessment tool 8). A second accentuation stresses the role of sustainability assessment tools as *quality managers* that help to further systematize and improve the accountability of a university’s engagement with sustainability. Here, the focus is on a technical description of the nature and types of different indicators as well as references to processes of their development (e.g. sustainability assessment tools 2, 5, 10). Finally, a third accentuation lies on the role of sustainability assessment tools as mechanisms generating competitive advantages. Here, the focus is on opportunities to compare and benchmark the university’s sustainability performance over time, as well as against other institutions (e.g. sustainability assessment tool 12).
**Fields of action**

Fields of action that universities should attend to in their engagement with sustainability are not exclusively addressed in the lists and sets of indicators and criteria. At least some sustainability assessment tool documentation already contains references to priority fields in the introductory parts. The analysis shows that education and operations are commonly mentioned in the sustainability assessment tools under investigation. Interestingly, several sustainability assessment tools already engage explicitly with specific issues in the field of operations such as energy, waste, and water management (sustainability assessment tools 5, 7, 10), carbon management and reduction (sustainability assessment tool 10), infrastructure and transport (sustainability assessment tool 7), staff and administration (sustainability assessment tools 10, 11, 12), sustainable food and management systems/auditing (sustainability assessment tool 10) in their introductory parts. Furthermore, research is classified as an essential field of action (sustainability assessment tools 1, 2, 6, 11, 12). Interestingly, there are some references to single issues such as participation (sustainability assessment tools 6, 8, 10, 11) and environmental policy (sustainability assessment tool 10), while outreach and society feature only in a small number of sustainability assessment tools (1, 2, 11).

**Discussion**

The observed overrepresentation of the field of operations is in line with previous findings in the field (Fig. 2). However, and curiously, this overrepresentation does not figure as prominently in the qualitative study, where education was prominently introduced as a constitutive element of a sustainable university. On a more detailed level, the findings of the comparative analysis of thematic clusters can be interpreted to rather account for a pluralistic diversification than a hegemonic standardization of
sustainability assessment tools, as several sustainability assessment tools were shown to have developed specific profiles and priorities.

The analysis highlights not only dominant fields in universities’ engagement with the sustainability agenda. It also sheds some light on rather marginal, yet emerging initiatives in the field. Among them the role of research promotion measures, student career counselling or community policy engagement, to name only a few. These *niche clusters* point to a still underrepresented role of the university: as an actor embedded in complex temporal and spatial societal networks and systems, it can influence and interact with (e.g. through intensified efforts in the field of research on and for sustainable development, the promotion of sustainable career paths both inside and outside academia, or more straightforward policy engagement in the community).

The findings of this study need to be critically appraised against some limitation resulting from the study’s design. We want to point to and discuss three levels of limitations: contextual, semantic and focal. The first level of *contextual* limitations results from the analysis’ indicators and criteria being extracted from the sustainability assessment tools and therewith being investigated in isolation from their contextual environment. The sustainability assessment tools included in this study, however, stem from different regions with specific political and sociocultural contexts. While for example sustainability assessment tool 9 serves as an obligatory framework for university development in a European country, sustainability assessment tool 2 represents a voluntary tool developed by an international network for universities in the entire Asian region. Furthermore, the sustainability assessment tools included in this study represent both recent developments as well as established and widely spread approaches in use today. This heterogeneity is also reflected in the diverse purposes and
approaches underpinning the different sustainability assessment tools, ranging from approaches that provided generic guidance in the early phase (tool 11) to criteria-based official enquiries into state universities’ sustainability efforts (tool 3) and to technically advanced indicator systems that incorporate certification and accreditation mechanisms (tool 12). Another distinction that needs to be taken into consideration is that some sustainability assessment tools explicitly turn to specific questions and thus consequently neglect certain fields of action in favour of others (e.g. sustainability assessment tool 8). This diversity inevitably constitutes confinements on the comparability of the approaches.

The second level of *semantic* limitations results from the fact that the main analysis of indicators and criteria was based on the assumption that each indicator or criterion has only one unique semantic attribute. Hence, the approach chosen did not allow for the multiple coding of single indicators and criteria. While the coding was carried out independently by three coders to enhance intersubjectivity, the unanimous attribution of codings was impeded by the semantic polyvalence of single indicators or criteria. For example, the installation of a green garden for students on campus could be attributed both to the clusters of *management of physical resources* and *informal/extracurricular education*. Beyond that, as acknowledged in the literature on sustainability assessment tools, overlaps between the different fields of action and between thematic clusters are inevitable.

The third level of *focal* limitations results from the fact that the study inevitably neglects other relevant questions, for example concerning the quality and applicability of different indicators and criteria, or what nuances in understandings of sustainability and sustainable development are underpinning the different sustainability assessment
tools and how these affect the selection of indicators and criteria. In light of these restrictions, the findings of this study should not be interpreted as evaluations of the overall usability of different sustainability assessment tools for universities’ development processes towards sustainability. They do, however, allow sketching trends and tendencies with regard to priorities, niche themes and different fields and facets of a sustainable university in the current landscape of sustainability assessment tools.

**Conclusion**

Assessment and evaluation tools for higher education institutions constitute a vibrant and growing field with ever new sustainability assessment tools emerging in different parts of the world. With this comes the need for systematization to provide orientation and allow for comparison. This paper addresses this need. It provides an update and extension of previous pioneering comparative studies on sustainability assessment tools. Methodologically, we sought to strengthen the rigour of current approaches by outlining the methods used and analytical steps taken as well as by using independent coders and reporting intercoder reliability. As to any qualitative research, there are limits with respect to the technical reproducibility of the creative momentum involved in second-level coding of emerging themes and patterns. We agree with Wet and Erasmus that “this creativity does not, however, imply a lack of systematic and rigorous practice” (2005, 39). In this sense, it would be fruitful not only to have more comparative research in the dynamic field of sustainability assessment tools, but to work towards setting standards for the analysis collaboratively.

The analysis of more than 600 indicators and criteria extracted from 12 current sustainability assessment tools provides an account of the extent to which different
functions of a sustainable university has been addressed and operationalised. For more detailed insights, a total of 17 thematic clusters have been identified in an inductive coding process involving three independent coders that further refine the main functions \textit{operations}, \textit{research}, \textit{education} and \textit{community outreach}. Finally, this study’s supplementary content analysis of introductory passages in manuals and documentations allows contrasting the empirically identified patterns with espoused patterns of reasoning for why, how and in what fields universities should engage with sustainability.

The results of the analysis support former findings. Overall, we observe a strong bias in the indicators and criteria towards the field of operations and, more specifically, physical resource management. This is striking since education and research are commonly referred to as crucial fields of action and key functions of universities, as the supplementary content analysis reveals. Apparently, we are observing a general gap between postulated areas of highest impact and factual priorities in the evaluation and assessment of the sustainable university. In this respect, we can agree with Yarime and Tanaka (2012) that more work is needed to substantiate the so far underrepresented fields of a university’s engagement with sustainability, namely education and research. While not much seems to have changed with regard to the overall share of the different fields, the more detailed comparative analysis of thematic clusters and the supplementary content analysis point to dynamic processes of diversification and differentiation in the sustainability assessment tool landscape. This becomes evident in the extent to which the different sustainability assessment tools address the four key functions (see Fig. 2), but also on a more refined level in the distribution of different thematic clusters where it can be observed that some thematic clusters are mostly upheld by only one or two sustainability assessment tools (see Tab. 2). On the one hand,
the increasing diversity of sustainability assessment tools ready for use certainly bears
great potential for more customized and yet systematized development processes in
universities. On the other, however, with this development comes the ever increasing
need for practitioners to critically reflect on the underpinning framings and contouring
of essential fields of action that one inevitably buys into with the decision for one single
sustainability assessment tool. Pilot studies have been carried out to analyse how
international declarations and institutional policies “are affecting various institutions
[higher education institutions; by author] in how they frame the central task of
becoming sustainable” (Wright 2002, 203).

The questions if, in which ways and to what extent sustainability assessment tools exert
an influence on what those implementing them on a local level understand a sustainable
university to be about, remains an open empirical question and a starting point for future
research. In the meantime, university members and stakeholders are well advised to not
give up the debate about what makes their university a sustainable one too easily.

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1 11 indicators and criteria could not be assigned to a thematic cluster. All numbers have been rounded to the closest whole number which is why not all columns add up to 100 per cent.