State of higher education institutions' sustainability reporting

Master Thesis
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Kurzfassung

Das Ziel dieser Masterarbeit war es, einen konkreten Überblick über den aktuellen Stand der Nachhaltigkeitsberichte von öffentlichen Universitäten zu bekommen. Ausgangspunkt waren die 17 Nachhaltigkeitsziele der Vereinten Nationen aus dem Jahr 2015 und die Global Reporting Initiative Richtlinien zur Erstellung von Nachhaltigkeitsberichten. Es wurde eine Literaturrecherche nach dem Prinzip eines systematischen Übersichtsberichts durchgeführt. Dabei wurde eine bekannte Datenbank auf Literatur zum Thema „Nachhaltigkeitsziele in Universitäten“ durchsucht. Dabei wurde eine Forschungslücke identifiziert, welche anschließend konkretisiert und erforscht wurde. Auf zwei verschiedene Arten wurden alle offiziellen Nachhalitgkeitsberichte in Österreich, Deutschland und der Schweiz untersucht, bewertet und die Ergebnisse verglichen. Exzellente Veröffentlichungen kamen von der Eidgenössische Technische Hochschule in Zürich und der Universität für Bodenkultur in Wien.

Abstract

The aim of this thesis was to get a concrete overview of the current state of sustainability reports of public higher education institutions (HEIs). The starting point were the 17 Sustainable Development Goals, issued by the United Nations 2015 and the Global Reporting Initiative guidelines for the preparation of sustainability reports. A literature search was conducted according to the principle of a systematic literature review. A well-known database was searched for literature on the topic of "sustainability development goals in HEIs". A research gap was identified, which was then concretised and researched. In two different ways, all official sustainability reports issued in Austria, Germany and Switzerland were examined, rated and the results compared. Excellent publications came from the Swiss Federal Institute of Technology in Zurich and the University of Natural Resources and Applied Life Sciences in Vienna.

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1 Introduction

After being only on the agenda of alternatively thinking individuals for most parts of the 20th century, sustainability has finally made its way into the priorities of our 21st century society. Nowadays, the concept of sustaining various standards for future generations and providing solutions against upcoming challenges makes up a substantial part of any political program. Implementing sustainable ideas and concepts into our hectic capitalistic system requires large reorientations in many fields. The exploitation of not only natural resources, but also human labour can finally be described as outdated. Although some politicians deny an anthropogenic contribution to climate change, in terms of scientific evidence, a connection between human actions and complex environmental problems is undeniable. In order to ensure a fact-based approach, sustainability has to be taught at learning institutions - the technical term being Higher Education for Sustainable Development (HESD). [1, 2]

In September of 2000, after numerous meetings, world leaders signed Millennium Declaration[3] by the United Nations (UN), which included eight key goals for a better life on earth. These so-called Millennium Development Goals (MDGs)[4] included fighting against poverty, hunger, disease, child mortality and strengthening the topics of education, equality, environmental sustainability and health. At the summit of 2010, first progressions towards achieving these 8 goals were presented: reduction in extreme poverty and child mortality, as well as significant lowering of HIV infections and children, that dropped out of school. However, as these topics grew in importance and with progress being slow, a new round of goals were introduced. At the general assembly of the UN in September 2015, all 193 member states have committed themselves to realising the 17 Sustainable Development Goals (SDGs), also called the “2030 Agenda”[5]. In addition, a continuous evaluation process was designed in order to track progress. The big goal of the sustainability reporting (SR) is guiding organizations in measuring, understanding and communicating all parts of sustainability, namely economical, ecological and social performance. A vital part of this process is setting targets and managing the transformation to achieve them, which basically means achieving SDGs more effectively. In 2014, the European Union (EU) issued a directive[6] about compulsory non-financial reporting for organizations involving more than 500 people. These reports should include all information concerning sustainability, such as economic, environmental, social and educational details.

[1] Waas, Verbruggen, & Wright, 2009
[2] Barth & Timm, 2011
[3] https://www.ohchr.org/EN/ProfessionalInterest/Pages/Millennium.aspx (Retrieved February 7, 2021)
[4] https://www.undp.org/content/undp/en/home/sustainable-development-goals/background.html (Retrieved February 9, 2021)
[5] General Assembly, 2015
[6] Directive 2014/95/EU, 2014

These content requirements, as defined by (Jaeschke & Lopatta, 2014), is described in Table 1 on page 5. In private companies these reports are getting a lot of attention, but what is the current situation in the public sector, with higher educational institutions (HEIs) playing such a crucial role in our sustainable society?

Consequently, the goal of this work is to examine the current state of sustainability reports of HEIs. This thesis consists of two main parts, a systematic literature review (SLR) and a benchmarking analysis (BA). Before the main parts, the initial situation, the problem, the target, the scope and the procedure will be explained, in order to gain a thorough overview. Afterwards, a conclusion will be drawn and an outlook for the future will be given.

1.1 Initial Situation

Today the topic of sustainability is more relevant than ever before. Governments worldwide have turned their focus to all three elements of this topic, economic, ecological and social sustainability. As HEIs have a public responsibility of offering a sustainable surrounding for employees and students, HEIs present their sustainability impacts in scientific journals or in official sustainability reports. With this new hype, the term “greenwashing” also emerged. This suggests, that an institution only publishes a SR in order to wash away their failures in terms of sustainability.[7] Sustainability reports vary in length and detail, depending on the given budget and priority and on the standard of the HEI itself. The problem that seems to occur is that an exceptional sustainability report might come at great expense of cost and time, whereas the motivation is simply an obligation to society, to the UN and EU orders or to the stakeholders of the HEI itself.[8] In contrast, a first-class sustainability report can be used as top-class marketing and relevant political ammunition concerning current affairs. However, although the motivation behind SR can vary, only the state of SR concerning the achievement of SDGs will be judged and analysed in this thesis. Measuring progress towards achieving SDGs is not only a political discussion, but also a technical challenge[9]. As later described in subchapter 1.3, each SDG has several targets, which again have indicators to evaluate the SDGs achievement. This detailed approach makes it possible to judge the progress towards SDGs in a scientific way. It is expected for HEIs to be more concerned about SDGs regarding topics close to their day to day actions such as education, energy and equality. SDGs with less attention include hunger, poverty or peace.

[7] Laufer, 2003
[8] Brusca, Labrador, & Larran, 2018
[9] Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development, 2018

1.2 Target

This thesis has two main targets. Firstly, give a broad summary of the state of the art in the field of SR of HEIs, concerning their publication on literature on the topic of SDGs. This sample of papers will be scanned for a research gap. Secondly, official sustainability reports of HEIs in a defined area will be rated individually in two different ways. Firstly, in terms of reporting on SDG achievement and secondly in terms of reporting on HEI specific SDG-targets. Afterwards, a conclusion will be drawn and an outlook will be given. This information will be helpful for authors of future sustainability reports, as they can not only view examples of best-practise, but also see how reporting on SDGs and their targets can be assessed. HEIs will be able to get a quick overview of the current field, as well as a recommendation to creating a report, that focuses on SDGs and their targets. At the end, an overview of the current state of the art in SR will be achieved.

1.3 Scope

The focus of this thesis lies on the 17 goals, which were presented by the UN's Department of Economic and Social Affairs in 2016[10]. As presented in Figure 1, these targets have a broad variety in topics. The mission statement of these global goals is *"A blueprint to achieve a better and more sustainable future for all by 2030"*.

Figure 1: Sustainable develompent goals[11]

[10] https://sdgs.un.org/goals (Retrieved December 11, 2020)
[11] Guidelines for the use of the SDG logo including the colour wheel, and 17 icons

The 17 SDGs of the 2030 Agenda include basic human needs like avoiding poverty and hunger, as well as achieving good health and living in peace. Later they progress to social aspects of sustainability, like quality education, equality and work conditions. Ecological features like clean water, unpolluted energy and responsible consumption are inevitable to sustainability. On the same topic, the SDGs include climate action and protection of life on land and under water. Economic aspects include growth, innovation and industry. The 17 SDGs are not only interlinked but also interdependent. Their strong connection continuously defines the road to success and individual goals cannot simply be achieved separately. In addition, these are global objectives, there is no single nation or institution, that can ensure the achievement or deny the accomplishment of the 2030 Agenda. Each SDG is made up of several targets and unique indicators. In total, the 17 SDGs have 169 targets and 232 indicators. These targets will be described in more detail and used to evaluate SRs in chapter 3.

A popular tool when it comes to SR is the independent Global Reporting Initiative[12] (GRI). This is an international communication method, concerning the sustainable aspects of an organization, such as climate change, gender equality or corruption. As GRI standards are developed for the private sector, a modified version for HEIs[13] is presented in Table 1:

Dimension	**Category**	**Aspect**
Economic	Economic	Economic performance Market presence Indirect economic impacts
Environmental	Environmental	Material Energy Water Biodiversity Emissions, effluents, and waste Products and services Compliance Transport Overall
Social	Labour practices and decent work	Employment Labour/management relations

[12] https://www.globalreporting.org/
[13] Jaeschke & Lopatta, 2014

		Occupational health and safety Training and education Diversity and equal opportunity Equal remuneration for women and men
	Human rights	Non-discrimination
	Society	Local communities Corruption Public policy Anti-competitive behaviour Compliance
Educational	University operations	Student demographics Quality management Campus life Student mobility
	External community	Community activity and service
	Curriculum	SD incorporation in curricula Interdisciplinarity and transdisciplinarity Self-regulated learning
	Research	Grants Research projects Interdisciplinarity and transdisciplinarity

Table 1: The modified GRI guidelines for HEIs[14]

Next to the three classic pillars of sustainability performance of an organisation that GRI guidelines identify, namely the economic, environmental and social dimensions, an additional feature is introduced, i.e. an educational dimension. Focusing on internal and external operations and communities of a HEI, attention is turned to various new aspects. These include for example students' demographics and mobility, as well as campus life and quality management. In addition, it contains community activity and service, incorporation of sustainable development in the curriculum and research projects including their grants.[15] In chapter 3, HEIs will also be evaluated on whether or not they use the GRI in their SR.

[14] Jaeschke, 2014
[15] Huber & Bassen, 2017

1.4 Procedure

In the chapter 2, the theoretical background on the topic will be delivered using a SLR. The goal is to depict the current state-of-the-art of the recently published literature on SR in HEIs. The SLR will be conducted in an online database with the use of keywords and other specifications, like commonly used metrics for papers and journals. As a result of the SLR, a small sample of relevant papers will be obtained, with which an overview of the present situation will be achieved. These papers will then be summarised and displayed in the following chapter. Afterwards, a benchmarking analysis will be performed in chapter 3. All of the official HEI sustainability reports since 2016 in Germany, Austria and Switzerland (the so called DACH-region) will be reviewed. These reports will be evaluated on whether or not they include and report on achieving of the 17 SDGs and their targets respectively. They will also be rated how far they followed the GRI, described in Table 1. At the end, the thesis will be concluded with an outlook in chapter 4, which can be used as a recommendation for future sustainability reports. All additional information and data from excel spreadsheets or online database searches, that is described or mentioned but not shown, will be presented transparently in the appendix.

2 Systematic Literature Review

In order to get an overview of the state of the art, a systematic literature review (SLR) is performed. Originally used in the review of health care literature in 20th century, this type of research has become popular across all topics of science.[16] This research methodology aims to systematically and transparently review the literature on a specific topic. An SLR provides an insight into the state of a research field, which is exactly what is required for in this thesis.[17] This chapter is divided in three parts.[18] Subchapter 2.1 describes the research question, followed by an explanation of the methodology in subchapter 2.2. At the end of the chapter, the results will be displayed and analysed.

2.1 Research Question

The research question, which was previously announced as *"what is the state of HEIs sustainability reporting"* has a clear focus on the 17 SDGs. In order to find out, if HEIs are reporting on achieving SDGs, an online database will be scanned for published literature. A more specific search will bring up fewer outcomes. The exact research procedure as well as all other techniques used is presented and explained in the methodology chapter 2.2.

2.2 Methodology

In this subchapter, the whole procedure of the SLR is explained in detailed steps. The literature search of the review will be carried out in Scopus[19], since it is the largest citation database of peer-reviewed literature. In order to get an initial result, the search key string, that is displayed in Figure 2 is entered into the Scopus online version. An explanation of all commands used for the specific Scopus Search Key String can be found in Table 2. These commands are necessary for the reduction of the sample size from a very large number to a manageable size, as well as increasing the relevance of the results. Quality assessments, which will be described later in this subchapter, ensure that only well-cited documents from renowned journals are included. Afterwards, the method of data extraction is explained and displayed, before the results are summarised and analysed in subchapter 2.3, concerning the original target of HEIs reporting on SDGs. [20] [21]

[16] Whittemore & Knaf, 2005
[17] Davis, Mengersen, & Benn, 2014
[18] Wright, Brand, Dunn, & Spindler, 2007
[19] https://www.scopus.com/ (Retrieved December 8, 2020)
[20] Snyder, Witell, Gustafsson, Fombelle, & Kristensson, 2016
[21] Snyder, 2019

Command	Explanation
"Higher Education Institution*"	All HEIs will be included
AND "Sustainab*"	This command includes sustainability, sustainable development & sustainable development goal
AND "Report*"	All reports will be searched
AND (LIMIT-TO (LANGUAGE, "English"))	Only English documents will be displayed
AND (LIMIT-TO (SRCTYPE, "j"))	The only source type to be included are “journals”
AND (LIMIT-TO (PUBSTAGE, "final"))	Only the final publication versions will be displayed
AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp") OR LIMIT-TO (DOCTYPE, "rer"))	This command means that the result is either an article, aconference papers or a review
AND (LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020))	This command ensures that only reports that have been published between 2016 and 2020 will be displayed
AND (LIMIT-TO (FREETOREAD, "all"))	This command displays only documents with “open access”
AND (LIMIT-TO (EXACTKEYWORD, "Sustainability") OR LIMIT-TO (EXACTKEYWORD, "Sustainability Reporting") OR LIMIT-TO (EXACTKEYWORD, "Sustainable Development") OR LIMIT-TO (EXACTKEYWORD, "Sustainable Development Goal") OR LIMIT-TO (EXACTKEYWORD, "Sustainable Development Goal (SDGs)") OR LIMIT-TO (EXACTKEYWORD, "Higher Education")) OR LIMIT-TO (EXACTKEYWORD, "Higher Education Institutions") OR LIMIT-TO (EXACTKEYWORD, "Higher Education Institutions (HEIs)"))	This combination of commands focuses only on results that contain any of the keywords “Sustainability”, “Sustainability Reporting”, “Sustainability Development”, “Sustainability Development Goal”, “Sustainability Development Goal (SDGs)”, “Higher Education”, “Higher Education Institutions” or “Higher Education Institutions (HEIs)”

Table 2: Search Key String commands

The research question defines the keywords that are used to search for literature: “Sustainable Development Goals”, “Higher Education Institute”, and “Reporting”. Abbreviations and variations of these keywords are also taken into account. All article titles & abstracts of every document in the Scopus data base will be scanned for the entered expressions. A later refocus on these keywords helps minimizing bias. This initial search results in 234 papers. Commands from Table 2 reduce this size to smaller sample. For example, they ensure that documents in the sample content are written in English and published in peer-reviewed journals, in their final version. Another command ensures that the results are either articles, reviews, or conference papers. The time frame command includes only papers in range from the announcement of SDGs in 2016 to the end of 2020. The *FREETOREAD, "all"* command ensures open access

of the results. In addition, a specification of the keywords “sustainability”, “sustainability development”, “sustainability development goals”, “sustainability development goals (SDGs)”, “Higher Education Institutions” and “Higher Education Institutions (HEIs)” ensures accurate results. Sometimes a bias occurs, for example when the keyword like “university” is used in the authors affiliations or the keyword “sustainability” is only the journal’s name. As a result, irrelevant results may appear. In order to ensure the relevance of the results, the documents’ keywords are reviewed in the Scopus result list. A screening of each paper’s title, keywords and abstract guarantees that irrelevant results are excluded. In Figure 2, the final search key string is displayed. Changes in order between the SKS in Figure 2 and the list in Table 2 can happen, as all of the commands, are strung together automatically by Scopus in the same order, as they were selected in the side menu. Different orders of commands all have the same result, as they are commutative.

```
TITLE-ABS-KEY("Higher Education institution*" AND "Sustainab*" AND "Report*") AND ( LIMIT-
TO ( LANGUAGE,"English" ) ) AND ( LIMIT-TO ( SRCTYPE,"j" ) ) AND ( LIMIT-TO (
PUBSTAGE,"final" ) ) AND ( LIMIT-TO ( DOCTYPE,"ar" ) OR LIMIT-TO ( DOCTYPE,"re" ) OR LIMIT-
TO ( DOCTYPE,"cp" ) ) AND ( LIMIT-TO ( PUBYEAR,2020) OR LIMIT-TO ( PUBYEAR,2019) OR
LIMIT-TO ( PUBYEAR,2018) OR LIMIT-TO ( PUBYEAR,2017) OR LIMIT-TO ( PUBYEAR,2016) ) AND
( LIMIT-TO ( freetoread,"all" ) ) AND ( LIMIT-TO ( EXACTKEYWORD,"Higher Education" ) OR
LIMIT-TO ( EXACTKEYWORD,"Sustainability" ) OR LIMIT-TO ( EXACTKEYWORD,"Sustainable
Development" ) OR LIMIT-TO ( EXACTKEYWORD,"Higher Education Institutions" ) OR LIMIT-TO
( EXACTKEYWORD,"Sustainability Reporting" ) OR LIMIT-TO ( EXACTKEYWORD,"Sustainability
Reports" ) OR LIMIT-TO ( EXACTKEYWORD,"Sustainable Development Goals" ) OR LIMIT-TO (
EXACTKEYWORD,"Sustainable Development Goals (SDGs)" ) )
```

Figure 2: The final search key string used in Scopus[22]

In the age of complete information overload, various metrics[23], used for the assessment of the significance of published literature, have gained importance across all subjects of research. As a result, these popular metrics, which now define a document’s impact or research quality, are not unanimously appreciated in the science community. This is partially down to the fact, that each metric has its own focus depending on the source, the method or the context. The metrics used in this thesis are the Field-Weighted Citation Impact (FWCI) and the h-index. Both will be described in this subchapter.

As presented in Figure 3, after the final Search Key String, 40 results were present. A screening process of all titles and abstracts reduced the number to 37, as three papers were eliminated due to a lack of SDG mentioning. This sample of 37 then underwent a quality assessment, which consisted of an analysis of the FWCI. This factor describes, how often a

[22] Own representation
[23] https://www.elsevier.com/authors/tools-and-resources/measuring-a-journals-impact (Retrieved December 28, 2020)

paper was cited, compared to what is expected according to the research field, subject or topic. A FWCI greater than 1.00 means, that the paper was cited more often than expected. Vice versa, a value below 1.00 means, that the amount of citations did not fulfil the original outlooks. For this thesis, all papers with a FWCI smaller than 1.00 were eliminated. All eliminated papers can be seen in the Appendix. This process reduced the sample size to 19 documents.

The h-index was invented in 2005 by Jorge Hirsch and determines the worldwide recognition of a journal. In order to achieve the next level of the h-index, the previously published papers have to be cited for the amount of times of the level they want to reach. For example: if a journal has released has an h-index of 30, that means that 30 of all published papers have been cited at least 30 times each. If this journal wants to reach an h-index of 31, then 31 papers have to be individually cited for 31 times. As a result, it is difficult to reach another level, therefore, a higher h-index means a more respected, competent and popular journal.[24] In this thesis, all journals with an h-index of below 50 have been excluded, as the majority of the sample size in this step was published in journals with an h-index above 50. This ensures, that only papers from renowned journals, are taken into account. This eliminated four of the nine journals, which published one paper each, confirming the final sample size of 15, presented in Figure 4 in the next subchapter. Again, all steps of elimination can be looked up in the Appendix.

After arriving at the final sample size in Scopus, the literature is downloaded and organised in a reference management software called *Zotero*[25], which saves all chosen information about a paper such as author, title, publication journal, publication year, abstract and a PDF of the paper itself. The Digital Object Identifier (DOI), which is a unique identification number for each paper, is also included. Further reductions, which were described above (and are displayed in the Appendix) then lead to the elimination of several papers in *Zotero*. The resulting 15 papers were then extracted as a bibliography and are presented in chapter 2.3.

[24] Hirsch, 2005
[25] https://www.zotero.org/ (Retrieved December 26, 2020)

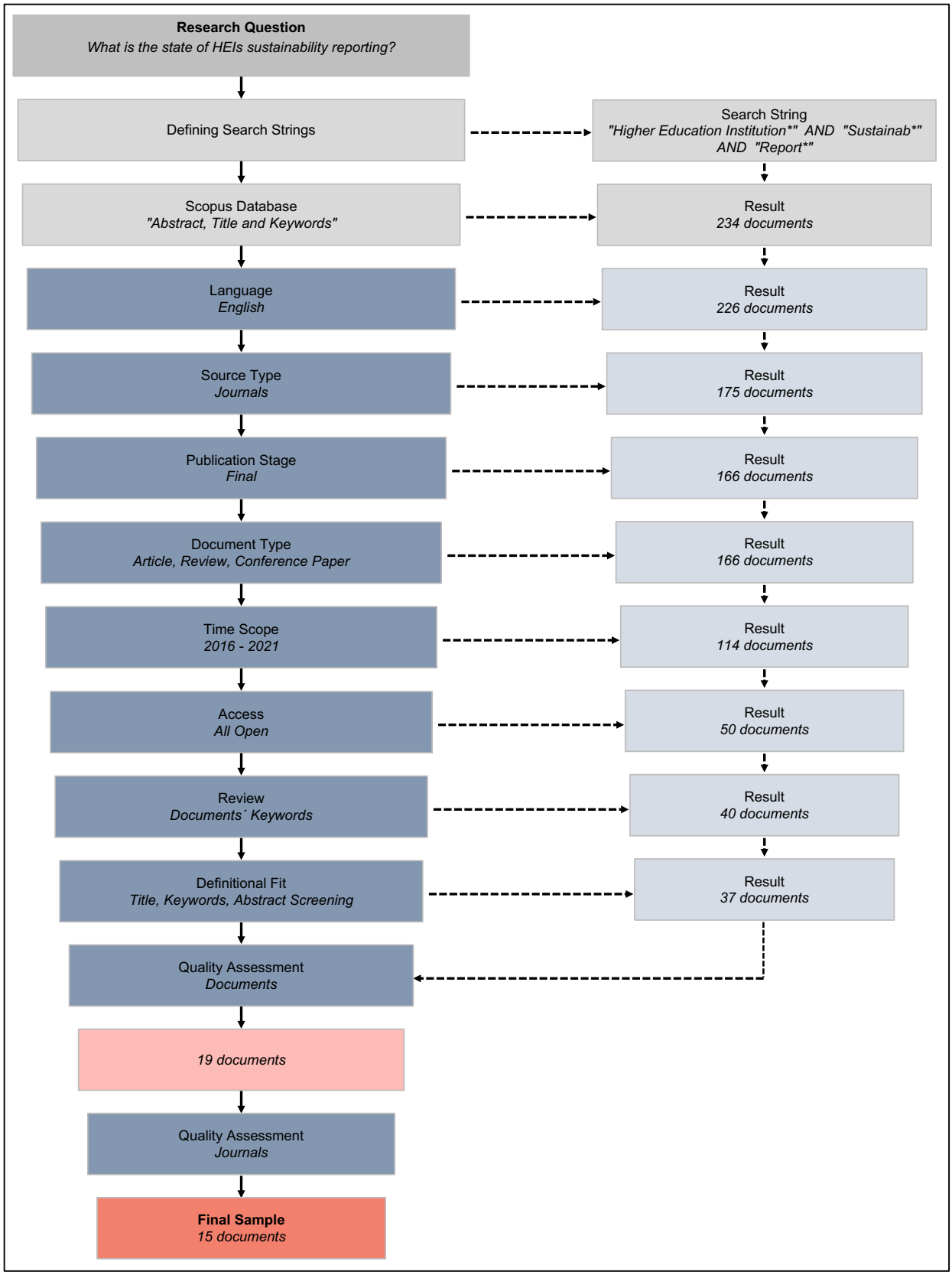

Figure 3: Process of literature collection[26]

[26] Own representation

2.3 Results & Analysis

The final 15 papers that resulted from the process of the literature collection are presented below in Figure 4.

Abubakar, I.R., F.S. Al-Shihri, and S.M. Ahmed. 2016. "Students' Assessment of Campus Sustainability at the University of Dammam, Saudi Arabia." *Sustainability (Switzerland)* 8(1): 1–14.
Berzosa, A., M.O. Bernaldo, and G. Fernández-Sanchez. 2017. "Sustainability Assessment Tools for Higher Education: An Empirical Comparative Analysis." *Journal of Cleaner Production* 161: 812–20.
Blanco-Portela, N., L. R-Pertierra, J. Benayas, and R. Lozano. 2018. "Sustainability Leaders' Perceptions on the Drivers for and the Barriers to the Integration of Sustainability in Latin American Higher Education Institutions." *Sustainability (Switzerland)* 10(8).
Caeiro, S., L.A.S. Hamón, R. Martins, and C.E.B. Aldaz. 2020. "Sustainability Assessment and Benchmarking in Higher Education Institutions-a Critical Reflection." *Sustainability (Switzerland)* 12(2).
Farinha, C., S. Caeiro, and U. Azeiteiro. 2019. "Sustainability Strategies in Portuguese Higher Education Institutions: Commitments and Practices from Internal Insights." *Sustainability (Switzerland)* 11(11).
Filho, W.L. et al. 2020. "Sustainability Leadership in Higher Education Institutions: An Overview of Challenges." *Sustainability (Switzerland)* 12(9).
Findler, F., N. Schönherr, R. Lozano, and B. Stacherl. 2018. "Assessing the Impacts of Higher Education Institutions on Sustainable Development-an Analysis of Tools and Indicators." *Sustainability (Switzerland)* 11(1).
Finnveden, G. et al. 2020. "Evaluation of Integration of Sustainable Development in Higher Education in Sweden." *International Journal of Sustainability in Higher Education* 21(4): 685–98.
Leal Filho, W. et al. 2019. "The Role of Higher Education Institutions in Sustainability Initiatives at the Local Level." *Journal of Cleaner Production* 233: 1004–15.
Romero, S., M. Aláez, D. Amo, and D. Fonseca. 2020. "Systematic Review of How Engineering Schools around the World Are Deploying the 2030 Agenda." *Sustainability (Switzerland)* 12(12).
Sales de Aguiar, T.R., and A.S. Paterson. 2018. "Sustainability on Campus: Knowledge Creation through Social and Environmental Reporting." *Studies in Higher Education* 43(11): 1882–94.
Schopp, K., M. Bornemann, and T. Potthast. 2020. "The Whole-Institution Approach at the University of Tubingen: Sustainable Development Set in Practice." *Sustainability (Switzerland)* 12(3).
Strachan, S.M. et al. 2019. "Using Vertically Integrated Projects to Embed Research-Based Education for Sustainable Development in Undergraduate Curricula." *International Journal of Sustainability in Higher Education* 20(8): 1313–28.
Vargas, V.R. et al. 2019. "Sustainable Development Stakeholder Networks for Organisational Change in Higher Education Institutions: A Case Study from the UK." *Journal of Cleaner Production* 208: 470–78.
Versteijlen, M., F. Perez Salgado, M. Janssen Groesbeek, and A. Counotte. 2017. "Pros and Cons of Online Education as a Measure to Reduce Carbon Emissions in Higher Education in the Netherlands." *Current Opinion in Environmental Sustainability* 28: 80–89.

Figure 4: Zotero bibliography in APA style of the final sample[27]

In order to analyse the result, we must go back to chapter 2.1, where the original research question was described. In order to state the relevance of these 15 final samples for our initial inquiry, each paper was once again scanned for the keywords "*sustainable development goals"* and "*SDG"*. After this, 9 papers, presented in Table 3 were left. These remaining documents were then summarised in three categories: purpose, methodology and findings. At the end of this subchapter, the findings will be analysed.

[27] Own representation

Paper	Purpose	Methodology	Findings
Assessing the impacts of higher education institutions on sustainable development-an analysis of tools and indicators (Findler, Schönherr, Lozano, & Stacherl, 2019)	The aim of this paper is to rate the measurements that sustainability assessment tools (SATs) deliver concerning the influence of HEIs on sustainable development and therefore on achieving SDGs.	During this process, which involved descriptive statistics and inductive content analysis, 1134 indicators for the purpose of sustainability assessment were analysed. These indicators came from 19 SATs which were exclusively created for use by HEIs.	The results of this study show, that SATs only focus on the internal effect of HEIs, but overlook the impact, that they have outside their bubble. SATs focus on internal data for accessibility reasons but should expand their focus to fulfil their purpose and their potential in SD.
Sustainability assessment and benchmarking in higher education institutions-a critical reflection (Caeiro, Hamón, Martins, & Aldaz, 2020)	This study focuses on tools to study and compare the implementation of education for sustainable development (ESD). Two case studies demonstrate the process.	As a result of an expert-based critical analysis of tools in form of a literature review, two tools were selected for application, one in each case study. Additionally, focus groups & key-actors were employed and SDG workshops were held.	The findings of this research suggest, that the two tools analysed are focusing only on internal sustainability impact of HEIs and suggests, that the external influence must be considered too.
Sustainability leaders' perceptions on the drivers for and the barriers to the integration of sustainability in Latin American Higher Education Institutions (Blanco-Portela, R-Pertierra, Benayas, & Lozano, 2018)	The goal of this research is to identify the leading factors as well as the main inhibitors of the integration of sustainability within HEIs.	The main sustainability managers and a number of relevant students from 45 different HEIs across South America were interviewed by experts to gather information about the situation.	At the end, 15 reasons for the stagnant development of sustainability in the academic and organizational structure of these HEIs and a lack of strategic planning were singled out.
Sustainability leadership in higher education institutions: An overview of challenges (Filho, et al., 2020)	The present investigation is aimed at understanding the challenges, that the leading staff of sustainability face in HEIs as well as their possible impact on gender issues.	50 university leaders from 29 countries performed an online questionnaire, based on the Inter-University Sustainable Development Research Program (IUSDRP).	The challenges presented were a lack in three categories: sustainability involvement in curriculum, investments in ESD and sustainable procurement. Furthermore, the results showed that gender issues were taken seriously.
Sustainability strategies in Portuguese higher education institutions: Commitments and practices from internal insights (Farinha, Caeiro, & Azeiteiro, 2019)	The aim of this document is to investigate, whether the integration of sustainability in 14 HEIs was accomplished by their own intentional planning and sustainability reports.	Sustainability reports and plans in the time frame between 2005 and 2014 were examined closely in order to find key responsibilities and methods.	The presented outcome proves, that progress in SD is made at HEIs, even though this movement is not accelerated by national politics.

Systematic review of how engineering schools around the world are deploying the 2030 agenda (Romero, Aláez, Amo, & Fonseca, 2020)	This review examines, how worldwide HEIs in the field of engineering are adopting the SDGs.	A systematic review in Scopus & Web of Science (WOS) issued 22 results, which were then examined.	The findings confirm a broad commitment to SDGs, however ideas of their implementation vary from adapting curricula to changing educational techniques.
The role of higher education institutions in sustainability initiatives at the local level (Leal Filho, et al., 2019)	As the title of this paper proposes, regional SD and the initiative for this is explored in 22 HEIs worldwide.	Advice on achieving their role is given, emphasising on the benefit of forming bonds and working together with local communities, in order to spread their knowledge,	This study highlights the capability of an HEI to become a helping hand in the local sustainability sector by describing a variety of actions that can be taken, in order to engage with the according community.
The whole-institution approach at the University of Tubingen: Sustainable development set in practice (Schopp, Bornemann, & Potthast, 2020)	In this survey, the comprehension of SD was investigated in a whole-institution approach in the form of a case study within a HEI.	This process does not only include the examination of papers, but also the inspection of the leading characters' expertise in understanding and implementing SD.	Results show that employees at this HEI work in line with UN's guidance of SD, work according to the whole-institution approach and proved expertise in understanding and implementing SD.
Using Vertically Integrated Projects to embed research-based education for sustainable development in undergraduate curricula (Strachan, Marshall, Murray, Coyle, & Sonnenberg-Klein, 2019)	This study focuses on the research-based education for sustainable development (RBESD) within the curricula of a HEI, by using vertically integrated projects (VIP).	This paper describes the combination of VIP & SDG as an important tool, that connects research-based education (RBE) and ESD to form RBESD.	The outcome shows the experiences gained from VIPs and presents the difficulties of implementing SD into the agenda of a HEI.

Table 3: Analysis of the final sample

If we now compare the purpose and the methodology of these 9 remaining papers, it is obvious that although they are conducted by various institutions across the world, who have of course set different research focuses, it seems that in total they have similar findings. With the purpose and the aim of the researches fairly similar, all scientists try to state the art of HEI's SR. In terms of methodology, numerous different approaches have been analysed, varying from classic interviews, to more modern online questionnaires, to the examination of published papers, systematic reviews and undertaking vertically integrated projects. One HEI even identified two tools for the assessment of sustainability[28]. Most of the surveys focused on the

[28] Caeiro, Hamón, Martins, & Aldaz, 2020

key players in terms of sustainability, some included undergraduates too. Considering the findings, it is a reoccurring theme in most HEIs, that sustainability is a trendy topic, which already has its theoretical position in the heads of all stakeholders confirmed. However, when it comes to implementing SDGs into the agenda or the curriculum without exception all HEIs struggle. The other issue, that is presented in most conclusions, is that although sometimes the SD works relatively well internally, it has close to no effect externally. It appears, that HEIs do not fully understand, that they are an important role model for society, particularly for younger generations. One study[29] complains about being inhibited by national politics, meaning that even if they wanted to improve their agenda in terms of sustainability, they are dependent on official government representatives.

All in all, it seems, that the state of SR is growing, with HEIs worldwide starting to focus on sustainability development and the SDGs. In spite of problems, concerning implementation of new agendas, external visibility and even politics, there seems to be an upward trend in SR overall. Generally, HEIs are only just properly turning their attention to the topic of sustainability, it seems to be certain that not only the quantity of reports, but also the quality of the findings will go up significantly in the near future.[30]

Considering the mentioning of SDGs in the nine papers of the SLR, only two mention a concrete goal. In both cases, SDG number 4 *quality education* is mentioned. Caeiro's paper[31] simply explains this goal, whereas the Romero paper[32] is a systematic literature review, which not only explains goal 4, but also mentions nearly all other SDGs in its results table. However, they are neither evaluated on progress, nor rated on reporting standard. It seems, that with the aim of analysing the sustainable reporting of different HEIs, the progression towards each SDG should be rated individually, while also examining the reporting standard for each HEI separately. As this has not been done in any of the discovered papers, an extensive benchmarking analysis focusing on exactly this aspect will be performed in the following chapter, in order to evaluate the state of each HEI's SR in a scientific way.

[29] Farinha, Caeiro, & Azeiteiro, 2019
[30] Ceulemans, Lozano, & del Mar Alonso-Almeida, 2015
[31] Caeiro, Hamón, Martins, & Aldaz, 2020
[32] Romero, Aláez, Amo, & Fonseca, 2020

3 Benchmarking Analysis

The art of benchmarking has become an established tool in recent years when it comes to comparing data.[33] Whereas this tool is normally commonly used in private sectors like finance, consulting and logistics, it is also becoming increasingly popular in the public sector.[34] Allan Schofield described benchmarking in 1998 in a nutshell as "*how well is the university (…) doing compared to others*?"[35] This summarizes exactly what will happen in this chapter.

This is the practical part, which will serve as a follow up, to the systematic literature review, which was performed above. The benchmarking analysis will be constructed as follows: firstly, the identified research gap from above will be researched by the use of a time and location specific benchmark. Afterwards, the research question will be expanded, in order to focus the study on exactly the framework, which was previously defined. Then, the results will be presented and analysed, before a conclusion will be drawn.

3.1 Research Gap

In their case study Yáñez, S. et al. (2019)[36] focus on the positive impact and benefits of SR in HEIs. As an essential strategic tool, SR is relevant for the management decision-making processes. The authors propose further research on this topic in other HEIs to be able to identify issues and key aspects of SR. In addition, an analysis of each individual SDG and their targets has not previously been performed, as described in chapter 2.3. The quality of the reporting itself, concerning the GRI (Table 1) has also not been investigated. As a result, such an analysis will be performed in this chapter.

3.2 Research Question

As the title of this thesis is quite too vague for a benchmarking analysis, we must specify it with more distinct boundary conditions.[37] First of all, we must include our defined target of considering the 17 SDGs. As mentioned in the first chapter, these goals were issued in 2016, hence our second specification is a time frame of 2016 to 2020. Then, we include a regional specification, cutting down the scope of worldwide to the three officially German-speaking countries of Austria, Germany and Switzerland. These three regions were chosen for similarity reasons, such as language (mostly German), wealth, high educational standard and no tuition

[33] Dattakumar & Jagadeesh, 2003
[34] van Vught, et al., 2008
[35] Schofield, 1998
[36] Yáñez, Uruburu, Moreno, & Lumbreras, 2019
[37] Ratan, Anand, & Ratan, 2018

fees charged. In the last step, we take a closer look at how the SDGs and their targets are presented and measured. In order to specify our research, a method called SAMPLE (Specific, Answerable, Measurable, Practical, Logical & Empirical) is used and can be observed in Figure 5. This method of specification was invented by the Campbell Collaboration "(…) organisation that produces systematic reviews of research evidence on the effectiveness of social interventions"[38].

Version #	Research Question	Specific?	Answerable?	Measurable?	Practicale?	Logical?	Empirical?
1	What is the state of the HEIs sustainabilty reporting?	No	No	No	No	Yes	No
2	What is the state of the HEIs sustainabilty reporting considering the 17 SDG?	Yes	No	No	No	Yes	No
3	What is the state of the public universities sustainabilty reporting considering the 17 SDG since their introduction in 2016?	Yes	Yes	No	No	Yes	No
4	What is the state of the sustainabilty reporting of public universities in the DACH-region considering the 17 SDG since their introduction in 2016?	Yes	Yes	Yes	No	Yes	No
5	What is the state of the sustainabilty reporting of public universities in the DACH-region considering the 17 SDG since their introduction in 2016? How are the SDGs presented and measured? What are the most common SDGs reported and which SDGs are neglected?	Yes	Yes	Yes	Yes	Yes	Yes

Figure 5: Research question defined by SAMPLE frame work[39]

3.3 Methodology

In Germany (D), Austria (A) and Switzerland (CH), the so called DACH-region, a total of 119 HEIs exist, with the majority (85) being in Germany[40], 22 HEIs are in Austria[41] and 12 are in Switzerland[42]. In this thesis, only public HEIs were included, therefore neither universities of applied science, nor private HEIs were taken into account. Out of these 119 relevant HEIs only 16 have published an official sustainability report, which can be viewed in Table 4. Four reports, which are marked in red, are not considered for the analysis, which will be performed in subchapter 3.4, as they were issued before 2016. At the end, only 12 sustainability reports remain for the SDG analysis. It has to be added, that many HEIs, who did not issue a concrete sustainability report, do publish a lot of sustainable information in their traditional annual reports, however, this research explicitly investigates official SR only. All 119 HEIs that were investigated in the DACH-area, are portrayed in a list that can be viewed in Figure 8 of the Appendix.

[38] https://campbellcollaboration.org/
[39] Own representation
[40] https://www.hochschulkompass.de/hochschulen (Retrieved January 14, 2021)
[41] https://www.bmbwf.gv.at/Themen/HS-Uni/Hochschulsystem/Universitäten (Retrieved January 14, 2021)
[42] https://www.berufsberatung.ch/dyn/show/5435 (Retrieved January 14, 2021)

Higher Education Institution (HEI)	Country	Year	Length
Graz University of Technology	AT	2016	62 pages
University of Natural Resources & Life Sciences Vienna	AT	2019	112 pages
University of Graz	AT	2012	93 pages
University of Bern	CH	2019	28 pages
University of Zurich	CH	2018	86 pages
Swiss Federal Institute of Technology Zurich ETH	CH	2018	102 pages
University of Konstanz	DE	2018	65 pages
University of Bayreuth	DE	2007	27 pages
Free University of Berlin	DE	2018	94 pages[43]
Technical University of Berlin	DE	2018	290 pages
University of Bremen	DE	2015	104 pages
University of Hamburg	DE	2014	80 pages
University of Kassel	DE	2019	86 pages
Leuphana University Lüneburg	DE	2020	69 pages
Carl von Ossietzky University of Oldenburg	DE	2017	58 pages[44]
University of Duisburg-Essen	DE	2020	124 pages[45]

Table 4: List of HEIs with official SR

In order to gain an understanding of how each HEI reports and describes the achievement of the SDGs, the twelve sustainability reports that fit into the defined time frame will be summarised in short paragraphs in this chapter. As we will see, each HEI portrays their contribution to the SDGs in a different way. Measuring progress towards SDG is not only political, but also technical.[46] Later we will see how these described examples perform overall, with each individual SR rated in two different categories. These two separate results are then presented and compared in chapter 0.

[43] 47 double pages
[44] 29 double pages
[45] 62 double pages
[46] Miolaa & Schiltz, 2019

3.3.1 Sustainability report summaries

Graz University of Technology

The first thing one can observe when reading this SR, is that it has a clear introduction on how it will focus on all three pillars of sustainability, as well as explaining the methodology and presenting an executive summary, which is basically an extended abstract. However, in the whole 62 pages there is no mentioning of SDGs at all. Similarly, the GRI guidelines are neither explained, nor used. As a result, it is only for those readers, who are very fond of each SDG's topic, to make a connection between each chapter and its meaning towards achieving one of the 17 goals. This confusion is later reflected, in a rather low overall score. The design of the report is very simple, with just plain text and some basic graphs, making it a below average experience to read. No summary is present at the end which is also negative for the overall understanding from a reader's point of view. The content itself is actually incredibly sustainability driven, nonetheless this thesis rates and describes the reporting of sustainability in HEIs and not the achievement towards sustainability itself. Considering, that this report was published in 2016, it could well be that it was broadcasted at the same time, that the SDGs were presented by the UN. If the next volume of this HEI creates a connection between each paragraph and the corresponding SDGs, as well as finding a better graphic design to portray results, it will be surely ranked among the top reports in this field.

University of Natural Resources & Life Sciences Vienna

The other Austrian SR, that will be looked at in detail in this thesis was issued by University of Natural Resources & Life Sciences in Vienna, commonly known as the "BOKU". It is quite the opposite of the previously described SR, partly due to the fact that it was published quite recently in 2019. Right from the start, this report is easy and informative to read. The SR is colourful and comes with a modern design, but the content itself is of top quality too. Like all brilliant sustainability reports, it starts with a greeting from the rector before the excellence in terms of SR is presented in a table of contents, where each chapter is assigned to one or several SDGs. This makes it incredibly easy for the reader, to see which SDG achievement is described in which section. At the same time, it gives a wholesome overview whether all SDGs are addressed or if some are left out. When the chapters are presented in detail in the report later on, each SDG is again attached to the corresponding segment. At the end, further credibility is gained by the signature of a renowned audit for this non-financial report, as well as a thorough description of the GRI standard for SR. As expected after all the positives, the BOKU's report finished in the top three in the final ranking.

University of Bern

This report is by far the shortest and unsurprisingly will finish at the bottom in the final rankings. The main problems are no mentioning of SDGs and GRI. As previously described for a different report (TU Graz) it is difficult for the reader, to find out which paragraph supports which SDG. With the total length of the SR being only 23 pages, it is difficult to gain an understanding towards this HEI's sustainability work. Although the content itself does focus on the three pillars of sustainability, the amount of content must be increased significantly in the next edition. Pictures, statistics and colours should be added to increase the reader's understanding of each topic. No summary is drawn at the end and with only one author, it seems that SR is not very high up on this HEI's priority list.

University of Zurich

This HEI delivered a great report in 2018, finishing joint third place. It contains all previously described contents of a top-quality SR. Although several corresponding SDGs are mentioned within each segment, a complete overview at the beginning of the report, where each chapter is assigned to one or more SDGs, would make a more appealing introduction for the reader. Apart from that, this report was above average in all categories and cannot be criticised further in terms of SDG reporting.

ETH Zurich

The sustainability report of the ETH is one of the best practise example and can be used as a role model for future reports. It starts off with a short overview, where the president of the institution himself writes a signed letter of introduction. This not only sets the tone of professionalism, but also proves that this institution has sustainability written right at the top of their priorities list. Format wise it is visible, that all keywords are hyperlinks, which either guide the reader to the according topic in the report, or directly opens the corresponding website in a browser, of course this works for PDF readers only. The overview continues with a section of highlights of the HEI's achievements concerning SDGs, where progress in 15 categories with subchapters is rated from 1 (not achieved) to 4 (achieved), with 2 and 3 meaning a certain amount of movement is made already in achieving this SDG. The introduction is rounded off with a paragraph about the HEI's approach to sustainability in general, where the importance of sustainability to the ETH is emphasised once more. At the end of the overview, four main focuses of the report are clarified: research, education, campus & dialog. The standard of the reporting is mentioned from page 94 onwards, with a thorough in-depth analysis of the GRI, mentioning each page, where GRI was relevant. Afterwards, a table of all SDGs shows the

relevant pages, where the corresponding topics were reported. If criticism hast to be made, then one could say that it is not evaluated, which SDGs are achieved completely and which ones are still work in progress. This should really be the go-to report, when considering how SDG-specific results can be achieved. Consequently, it comes with no surprise, that this report finishes second in the final rankings.

University of Konstanz

This is another report, that lacks the connection between presented topics and SDGs. Again, no mentioning of GRI can be found. After the briefest of introductions, the author heads straight into the content, puzzling the reader along the way. The modern design, which presents key figures in extremely large font, confuses the reader further. Whereas the content itself is decent, the presentation is poor. As this thesis focuses on the reporting of sustainability, rather than the implementation, it has to be criticised, that a bunch of meaningless pictures, combined with different styles of font does not make up a good report. Future editions should orient themselves on one of the excellent reports, which are described in this thesis in order to avoid another finish in the bottom three of the final ranking.

Free University of Berlin

This sustainability report also comes in a very modern design, however, in contrast to the previously described publication, this one is easy to read and follow. Nevertheless, apart from the great design, for a report published in 2020, the outcome is fairly poor. The only couple of pages that mention SDGs are 23 & 35, where all lectures and all projects are assigned to different goals respectively. The most popular SDGs in those two categories are 3, 4, 14 and 15. Whereas this does make sense in terms of GRI for reporting on the topic of education, this is only one of four main focuses, as presented in Table 1. The rest of the report does not mention further progress towards SDGs or GRI. As a result, the final rating for the Free University of Berlin is fairly disappointing, with a score below average.

TU Berlin

The report of the technical university of Berlin achieved the highest overall score, dropping next to no points in the process. It starts off with an overview of the five different categories, in which the HEI's work is presented: participation, teaching, research, working & construction. This, like seen before, is followed by a presidential introduction and an overview of the SDGs. Right from the first chapter, the report focuses not only on sustainability as a whole but on how each paragraph contributes in achieving individual SDGs. As desired, from a SR point of view, the corresponding SDGs are continuously mentioned, below each paragraph. In addition, the

content itself also refers and compares sustainable matters, e.g. in chapter 1.3., all courses with reference to sustainability are presented as a percentage of the overall number of lectures over the last 5 years. In surprise, this number decreased significantly between 2015 and 2016, however, it has risen again since then. Also in this chapter, one can find all university projects with sustainability references, displayed in a similar way. In a report of such great length, it is especially helpful to the reader, that after each paragraph, the relevant SDG is mentioned. At the end, there is an enormous appendix, which transparently displays all facts and numbers, that were previously mentioned throughout the report. However, no information is given, to what extent each SDG was achieved. Furthermore, no GRI index is used or explained anywhere. All in all, this really is the peak of SR and should act as a role model, for renowned HEIs in the future.

University of Kassel

This is an interesting example, of how good a sustainability report can be, without mentioning any SDGs. It is inevitable to assume that the author knows about the SDGs, as they are described in the preface. However, at no point in the whole report are they mentioned again. This leaves an analyst of this report in terms of sustainability reports perplexed. How can someone put such an effort into a report, without focusing on the key figures in terms of sustainability? With the content itself being great and the format & designed of the report above average, this HEI could double its final score without much effort. Further editions simply have to connect each paragraph to one or more SDGs as well as give an overview about it at the beginning. The GRI should also be included and explained in order to catch up to excellent reports.

Leuphana University Lüneburg

Although the Leuphana University of Lüneburg is able to show off four different certificates in all categories of sustainability, the report itself is well below average. Although it is a decent report overall, the only mentioning of SDGs is on page 12, with GRI receiving no mention at all. Here, five main SDGs are described to be the center of attention at the faculity of sustainability. However, these SDGs are neither explained in more detail, nor rated in terms of achievement. Consequently, the final score is low, as it is again difficult to find out which SDGs are achieved and to what extent.

Carl von Ossietzky University of Oldenburg

This above average report is the highest scoring SR that doesn't mention SDGs. Apart from this obvious mistake in terms of SR, this report is actually brilliant. The content is very relevant and although not overly long covers all sustainability topics. Its format makes it easy to read and key figures are highlighted in each chapter. A colourful design and lots of meaningful pictures with students & employees make it easy to read. Endless examples of projects, partners and networks are displayed and an extensive GRI overview is attached at the end. If the next publication includes the previously described connections to all SDGs, the Carl von Ossietzky University of Oldenburg will surely be among the top-rated SRs.

University of Duisburg-Essen

This excellent report has its focus clearly set on SDGs. It is a mix of various designs, colourfully displaying facts and figures. Most importantly, after each paragraph, the numbers of all corresponding SDGs are listed. As mentioned many times previously, this makes it easier to draw connections between chapters and SDGs for readers, who have not intensely studied all 17 goals. Although no SDGs are assigned to chapters in the table of contents, an overview of all goals is given at the end of the report. GRI is mentioned a few times in the "Process Management and Governance" chapter on pages 13 & 14 but never explained in detail. All in all this report gains a reasonable score in the final ranking, not far off the best.

3.3.2 SDG-targets

In order to rate these reports in a more technical way, all SDG targets were scanned and valued on HEI relevance. Similar targets were merged together and irrelevant targets were eliminated. A summary of HEI relevant targets can be found in Table 5. Different SDGs have different values, depending on the number of targets that were found to have HEI relevance. For example, SDG 4 and SDG 5 have 6 targets remaining, therefore contributing 6 points each to the overall score, with one point for each completed target. Other targets, which are more relevant to national governments than to HEIs only contribute 1 point to the final score. Examples are SDG 1 and SDG 2. The topics of poverty or farming are simply difficult to address by HEIs in the DACH-region. However, they still have a small contribute in the final result. These targets were used in the second part of the benchmarking analysis. All results are displayed and analysed in in the following subchapter. A detailed list, including the eliminated targets, can also be found in the Appendix.

SDG	Target summary: Research and development/teaching/projects/networks in the field of….	Value
1	"ending poverty" OR HEI support for persons at risk of poverty or social exclusion	1
2	"sustainable agriculture"	1
3	health and well-being, HEI programs for promoting well-being and health, number/percent of people on sick leave in a year or similar indicator or share of stakeholders with good or very good perceived health	1
4	inclusive/equitable/qualitative education/lifelong learning, early leavers from education and training - EU/non-EU citizen gap, tertiary educational attainment, employment rate of recent graduates, adult participation in learning or lifelong learning opportunities	6
5	equality/women empowerment, violence to women (%), Gender Pay Gap, Gender Employment Gap, Maternal/Paternal leave (%) or leading positions held by woman (boards, professor chairs with tenure tracks or similar)	6
6	sustainable water management or water exploitation index (plus (WEI+))	2
7	affordable, reliable, sustainable and modern energy, energy consumption, energy productivity or share of renewable energy consumption	4
8	sustainable economic growth, HEIs programs for training and upskilling AND/OR indicators of decent work	1
9	sustainable industrialization and fostering of innovation, research and development personnel, expenditures on (resources gained for) research and development and innovation, patent applications or mobility of stakeholders	5
10	reducing the inequalities within and among countries or Sustainable supply chain policies	1
11	sustainable (safe and resilient) cities, human settlements	1
12	sustainable consumption and production patterns, consumption of hazardous and non-hazardous chemicals, recycling rates or generated waste	4
13	climate change and its impacts or greenhouse gas emissions	2
14	sustainable use of oceans, seas and marine resources for sustainable development	1
15	terrestrial ecosystems, sustainable management of forests etc.	1
16	peaceful and inclusive societies for sustainable development, satisfaction of HEIs stakeholders (employees, students etc.) or accountable and inclusive institutions	1
17	global Partnership for Sustainable Development or HEIs partnerships and networks for sustainability, sustainable development, SDGs	1

Table 5: Summary of all targets relevant for HEIs

3.4 Results & Analysis

In this chapter, two different analysis will be presented. Firstly, an analysis of the 12 SRs with the focus set on the presentation of SDGs and the use of GRI will be presented. Secondly, an analysis of the reporting on the HEI relevant SDG-targets, which were selected and prioritized beforehand (see Table 5), will be described. In the second analysis, the GRI has a larger contribution.

3.4.1 Analysis with SDG Focus

In this part, each of the 12 sustainability reports was closely investigated, concerning the presentation of progress towards each SDG. The achievement of each goal was rated on a scale between 0 and 4, as shown in Table 9. Therefore, each SR got 17 scores between 0 and 4 each. An additional score of the same rating system could be achieved, if the report contained GRI of any kind, such as explained in Table 1. As a result, the total score of each SR was between 0 and 72, the latter would be accomplished, if full scores in each category were received. This scoring system is very similar to the ETH rating, described in chapter 3.3. The only addition was the 0 value.

Score	Meaning
0	SDG not mentioned
1	SDG mentioned but not achieved
2	small progress towards achieving SDG
3	big progress towards achieving SDG
4	SDG achieved

Table 6: Scoring system for SDGs

The final results are listed in Table 10. The Technical University of Berlin achieved the highest total score with 60, with the average being 44.3. Further top reports were issued by the University of Natural Resources and Life Sciences in Vienna, by the University of Zurich, the University of Duisburg-Essen and the Swiss Federal Institute of Technology in Zurich, which was already previously described as a best practise example. Poor reports in terms of SDG achievement were issued by the University of Bern, the Graz University of Technology and the University of Konstanz. None of these three HEIs included any GRI content or specifically stated which information or action leads to the completion of certain SDGs. However, the effort

to publish a sustainability report is recognised and even an average piece of work can be the predecessor and starting point for a great publication in the future. It has to be kept in mind, that a clear structure and obvious contributions towards SDG completion are appreciated.

Overall the quality of the reporting was much higher than expected, with more recent publications showing higher quality than older versions. The exact calculations of each individual SDG for every HEI can be viewed in the Appendix.

Rank	Higher Education Institution (HEI)	Score out of 72
1	Technical University of Berlin	60
2	Swiss Federal Institute of Technology Zurich ETH	55
3	University of Natural Resources and Life Sciences Vienna	53
4	University of Zurich	53
5	University of Duisburg-Essen	52
6	Carl von Ossietzky University of Oldenburg	50
7	University of Kassel	42
8	Leuphana University Lüneburg	38
9	Free University of Berlin	36
10	University of Konstanz	34
11	Graz University of Technology	33
12	University of Bern	25

Table 7: Analysis with SDG focus

In order to show what the HEIs focus was in their SRs, the SDGs were also ranked from highest to lowest (Table 11). It comes to no surprise, that SDG number 4 is the main focus and represented in great depth in all SRs. Its meaning includes the quality of education and a lifelong opportunity of learning. Further SDGs, which were well represented included affordable and clean energy (SDG 7) and climate action (SDG 13). An outstanding contribution to SDG number 7 was made at the University of Duisburg-Essen, where since the beginning of 2020, 100% of the energy used comes from renewable sources.[47]

[47] Niemann, Roose, Gansel, & Briese, 2020

At the bottom end, it is also fairly obvious, that in the central European DACH-region, the focus on life below water (SDG 14) as well as poverty (SDG 1) and hunger (SDG 2) is relatively low. The reason for this is that no country has access to the ocean and neither poverty, nor hunger are big issues in these wealthy nations. Thus, the HEIs do not pay much attention to these specific SDGs. One could argue, that with so many lakes and rivers in this area, SDG 14 could get more consideration in the future. However, it has to be said, that the quality of water in the lakes is very high and in many lakes the water is safe to drink.[48] The total score for the GRI was 18, with only the top four HEIs clearly reporting the use of GRI, therefore gaining full marks (4 points). One HEI mentioned the GRI a few times but didn't give a clear overview, therefore receiving a score of 2. The Technical University of Berlin actually does not mention the GRI, but even without those four points, its report received a tremendous 60 points, which make up 83% of the possible 72.

Rank	SDG	Score out of 48
1	Quality Education - 4	42
2	Affordable and Clean Energy - 7	41
3	Climate Action - 13	39
4	Good Health and Well-Being - 3	38
5	Gender Equality - 5	38
8	Decent Work and Economic Growth - 8	37
7	Strong Partnerships for the Goals - 17	37
8	Clean Water and Sanitation - 6	36
9	Industry, Innovation and Infrastructure - 9	32
10	Sustainable Cities and Communities - 11	31
11	Responsible Consumption and Production - 12	30
12	Reduced Inequalities - 10	28
13	Peace, Justice and Strong Institutions - 16	27
14	Life On Land - 15	24
15	Zero Hunger - 2	16

[48] Bathing Water Directive report, 2013

16	No Poverty - 1	10
17	Life Below Water - 14	7

Table 8: Total scores of all SDGs

3.4.2 Analysis with target focus

Each of the 12 sustainability reports was closely investigated, concerning the achievement of the SDG-targets, which are relevant for HEI. Each target was rated as yes (1 point) or no (0 points), as shown in Table 9.

Score	Meaning
0	SDG-target not mentioned
1	SDG-target mentioned/achieved

Table 9: Scoring system for SDG-targets

The targets were defined as relevant to HEI as seen in Table 5. The GRI (as explained in Table 1) is valued with an additional 10 points. As a result, a total of 50 points can be achieved by each HEI. The results are listed in Table 10. The Swiss Federal Institute of Technology in Zurich achieved the highest total score with 45 out of 50 possible points. Only dropping a few targets, such as for example not publishing numbers of early leavers from education. The University of Zurich finished in second place with 39 points, while the University of Natural Resources and Life Sciences in Vienna finishes third with 34. The average score of 30 was achieved by two HEIs, who share the sixth place. The University of Bern finishes last, with only 16 points. Just in front are the University of Konstanz in 11th place (21 points) and Graz University of Technology (26 points). As mentioned before, none of these three HEIs included any GRI content or specifically stated which information or action leads to the completion of certain SDG-targets. The exact calculations of all sub-targets for each SDG can be viewed in Figure 11 in the Appendix.

Rank	Higher Education Institution (HEI)	Score out of 50
1	Swiss Federal Institute of Technology Zurich ETH	45
2	University of Zurich	39
3	University of Natural Resources and Life Sciences Vienna	34

4	Carl von Ossietzky University of Oldenburg	33
5	University of Duisburg-Essen	32
6	Technical University of Berlin	30
6	Leuphana University Lüneburg	30
7	University of Kassel	29
8	Free University of Berlin	26
9	Graz University of Technology	25
10	University of Konstanz	21
11	University of Bern	16

Table 10: Analysis with target focus

In order to show what the HEIs focus was in their SRs, the SDG-targets were also ranked from highest to lowest (Table 11). However, as they now received different values the scoring system changed significantly. As a result, another column is introduced, where the achievement of each target in comparison to the reachable points is given in percent.

Rank	**SDG**	**Score**	**(% of max)**
1	Gender Equality - 5	46	64
2	Affordable and Clean Energy - 7	44	92
3	Industry, Innovation and Infrastructure - 9	39	65
4	Responsible Consumption and Production - 12	36	75
5	Quality Education - 4	30	42
6	Good Health and Well-Being - 3	22	92
7	Climate Action - 13	19	97
8	Peace, Justice and Strong Institutions - 16	19	79
9	Strong Partnerships for the Goals - 17	11	92
10	Clean Water and Sanitation - 6	11	46
11	Sustainable Cities and Communities - 11	10	83
12	Zero Hunger - 2	9	75

13	Reduced Inequalities - 10	9	75
14	Decent Work and Economic Growth - 8	7	58
15	No Poverty - 1	6	50
16	Life On Land - 15	3	25
17	Life Below Water - 14	2	17

Table 11: Total scores of all SDG-targets

3.4.3 Comparison of results

In order to compare the results from Table 7 and Table 10, the differences have to be explained. Whereas a focus on SDGs is more relevant to the common reader, it is also more vulnerable to green washing. There is a difference between simply adding information on a certain topic (SDG) or adding HEI relevant information on the completion of an SDG-target to a report. In addition, presenting a list of all completed targets is also not intended. For a SR to be scientifically valuable and at the same time SDG-focused and reader-friendly, top marks in both analysis is a must. This has been achieved by two HEIs in particular, namely the Swiss Federal Institute of Technology in Zurich and the University of Natural Resources and Life Sciences in Vienna. They finished in the top three in both analysis, therefore presenting relevant information towards achieving each SDG, but also in a more technical way, as they also report on completing the relevant sub-targets. HEIs such as the Technical University of Berlin and the University of Zurich finished particularly well in one analysis and above average in the other. This means, that they are either spot on at presenting SDGs and not overly exact on reporting on SDG-targets or vice versa. Overall their state of SR is still classified as great. At the other end of the table, the situation is the same. The University of Bern finishes last in both analysis. The bottom three are in both cases completed by the Graz University of Technology and the University of Konstanz.

A comparison of the SDG results does not make sense in this case, as they were altered in each SDG's value. Therefore, the SDGs with the highest valued targets ranked first in Table 11, with the least relevant HEI targets at the bottom.

4 Conclusion and Outlook

In this final chapter, both main parts that were conducted in this thesis will be summarised separately. Afterwards, an outlook will be given, that will conclude this work and its topic as a whole. This can be used as a recommendation for first time reporters, but also help HEIs improve their SR in the future.

4.1 Theoretical Part

The result of a SLR is always determined by its focus. In this case, clear cuts and specifications lead to a rather small final sample. If another database was added, the time scope enlarged or if more keywords had been used, then the final sample size would have been greater. For simplification reasons, only two metrics were used to reduce the sample size after the initial search key string. If this research was undertaken across several databases and samples would be more numerous, further metrics should be included in order to improve the quality of the results, as well as reduce its size.

4.2 Practical Part

In hindsight, it has to be said, that nearly all sustainability reports were performed truthfully and at a high standard. Initial suspicion of green-washing proved to be wrong, as nearly all HEIs mentioned their contribution to individual SDGs and to sustainability as a whole precisely and backed this up with completing the SDG-targets, which are relevant for HEIs. Some reported accurately to GRI standard, where others only mentioned GRI but without explanation. In terms of SDGs, the predicted most popular goals were shown to be true, as HEIs naturally tend to focus on quality education, renewable energy and climate action. The least considered SDGs also seem reasonable, considering the wealth and geographical locations of the investigated HEIs. However, this could be seen as an even more important reason, to help achieve these standards elsewhere in the world, rather than just ignore SDGs, which were more or less completed in its own country. Furthermore, in minor cases poverty & hunger still exist in these wealthy countries and the goal should be to completely eliminate these problems, not only in the HEIs country, but worldwide. The underwater SDG could also be given more attention, as these three countries have many lakes and rivers, where marine animals and wildlife needs to be protected. Generally, a mentioning of the relevant SDG after each paragraph contributes strongly towards the reader's understanding of the current paragraph. In the future, even SDG-targets could be included in SR. This would raise a report's trustworthiness significantly. In addition, in the table of contents, SDGs can be added to each topic where they are relevant. This was done well by many HEIs, especially by the Technical University of Berlin as

mentioned previously. The content was structured in order of the SDGs, with relevant topics always attached to the corresponding SDG. However, this HEI did not use or mention the GRI at all, leading to a lower score, especially in the second analysis. The ETH of Zurich, which achieved top marks in both analysis, even evaluated their own progress towards their sustainability goals. However, these targets do not match the official SDGs exactly and as a result, the reader is slightly confused.

4.3 Outlook

In the future, it would be pleasing to see the number of HEIs publishing official sustainability reports grow significantly. Even though, several HEIs do mention sustainable achievements in their annual report, even including ecological contribution and social matters, this is simply not satisfying anymore. HEIs play a pivotal role in our modern-day society, setting an example for all generations and corporations. They act as a role model for companies and institutions of all shapes and sizes. They should not underestimate their influence, but rather lead by example. Considering that only 10% of all HEIs (12 out of 119) published an official SR in the last 4 years is irritating and a disappointment as a whole. This number must increase significantly over the course of the next years. The outstanding works of the ETH in Zurich or the BOKU in Vienna can be used as a guideline when planning how to construct such a report, so that the reader can easily follow the content, as well as seeing clear progressions towards completing each SDG and their targets. All 17 SDGs should be focused on in depth even those, which might not be of extreme relevance to the HEI itself. HEIs, that have already issued a sustainability report have made a great contribution towards the 2030 Agenda and should already start working on their next publication. As the structure of their report already exists, it can effortlessly be improved in terms of length and arrangement. The best practise examples, which were set by several institutions can be followed and even the ETH in Zurich can increase the quality of their work, for example they could publish numbers of early leavers from education.

At the end of the day, a sustainable life style is desired by all members of society, it includes economic wealth, ecological harmony and social stability. Many private businesses would certainly follow such an example and our society as a whole would take a step into a more sustainable and life worthy future. An achievement of all 17 SDGs by the end of 2030 can only be achieved if all HEIs in the DACH-region and worldwide show solidarity with this vision. It was ensuring to read, that many HEIs are already working on a publication of a sustainability report in the short-term future. However, this does not count as a contribution towards the solution unless these promised reports are officially published. After all action speaks louder than words.

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List of abbreviations

BA	Benchmarking Analysis
DACH	Germany (D), Austria (A), and Switzerland (CH)
DOI	Digital Object Identifier
e.g.	For example (exempli gratina)
ESD	Education for Sustainable Development
ETH	Swiss Federal Institute of Technology in Zurich
EU	European Union
FWCI	Field-Weighted Citation Impact
GRI	Global Reporting Initiative
h-index	Hirsch-Index
HEI	Higher Education Institute
HESD	Higher Education for Sustainable Development
IUSDRP	Inter-University Sustainable Development Research Program
MDGs	Millennium Development Goals
n.a.	not available
RBE	Research-Based Education
RBESD	Research-Based Education for Sustainable Development
SAT	Sustainability Assessment Tool
SD	Sustainability Development
SDG	Sustainable Development Goal
SKS	Search Key String
SLR	Systematic Literature Review
SR	Sustainability Reporting
TU	Technical University
UN	United Nations
VIP	Vertically Integrated Projects
WOS	Web of Science

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Appendix

Appendix 1: Document quality assessment

Relevant
Not relevant

#	FWCI	Publication Year	Author	Title	Publication Title
1	8.54	2020	Caeiro, S.; H	Sustainability assessment and benchmarking in higher education institutions-a critical reflection	Sustainability (Switzerland)
2	5.13	2017	Tapia-Fonlle	Education for sustainable development in higher education institutions: Its influence on the pro-sustai	SAGE Open
3	4.86	2017	Leal Filho, W	Identifying and overcoming obstacles to the implementation of sustainable development at universitie	Journal of Integrative Environmental Sciences
4	4.19	2019	Hassan, A.; A	Integrated reporting in UK higher education institutions	Sustainability Accounting, Management and Policy Journal
5	3.50	2019	Vargas, V.R.;	Sustainable development stakeholder networks for organisational change in higher education instituti	Journal of Cleaner Production
6	3.42	2020	Filho, W.L.; I	Sustainability leadership in higher education institutions: An overview of challenges	Sustainability (Switzerland)
7	3.42	2018	Findler, F.; S	Assessing the impacts of higher education institutions on sustainable development-an analysis of tools	Sustainability (Switzerland)
8	3.09	2020	Finnveden, G	Evaluation of integration of sustainable development in higher education in Sweden	International Journal of Sustainability in Higher Education
9	2.76	2019	Leal Filho, W	The role of higher education institutions in sustainability initiatives at the local level	Journal of Cleaner Production
10	2.57	2019	Farinha, C.; I	Sustainability strategies in Portuguese higher education institutions: Commitments and practices from	Sustainability (Switzerland)
11	2.56	2020	Schopp, K.; E	The whole-institution approach at the University of Tubingen: Sustainable development set in practice	Sustainability (Switzerland)
12	2.17	2017	Berzosa, A.;	Sustainability assessment tools for higher education: An empirical comparative analysis	Journal of Cleaner Production
13	2.15	2020	Popescu, F.;	How do students assess the sustainability of their university? A comparison between dutch and roman	Amfiteatru Economic
14	1.93	2017	Versteijlen, I	Pros and cons of online education as a measure to reduce carbon emissions in higher education in the	Current Opinion in Environmental Sustainability
15	1.90	2018	Blanco-Porte	Sustainability leaders' perceptions on the drivers for and the barriers to the integration of sustainabilit	Sustainability (Switzerland)
16	1.66	2019	Strachan, S.I	Using Vertically Integrated Projects to embed research-based education for sustainable development i	International Journal of Sustainability in Higher Education
17	1.64	2020	Romero, S.;	Systematic review of how engineering schools around the world are deploying the 2030 agenda	Sustainability (Switzerland)
18	1.43	2018	Sales de Agu	Sustainability on campus: knowledge creation through social and environmental reporting	Studies in Higher Education
19	1.05	2016	Abubakar, I.	Students' assessment of campus sustainability at the University of Dammam, Saudi Arabia	Sustainability (Switzerland)
20	0.91	2016	Cotton, D.; M	Knowledge, agency and collective action as barriers to energy-saving behaviour	Local Environment
21	0.85	2020	Garrido-Yser	The potential role of stakeholders in the energy efficiency of higher education institutions	Sustainability (Switzerland)
22	0.85	2020	Risopoulos-F	Competences for solving complex problems: A cross-sectional survey on higher education for sustainal	Sustainability (Switzerland)
23	0.70	2018	Costa Junior	Educating for a systems design approach to complex societal problems	Journal of Engineering Design
24	0.70	2019	Di Carlo, F.;	Changing the accounting system to Foster Universities' financial sustainability: First evidence from Italy	Sustainability (Switzerland)
25	0.70	2019	Converso, D	The unbearable lightness of the academic work: The positive and negative sides of heavy work investm	Sustainability (Switzerland)
26	0.55	2020	Tomasi, S.; P	Educational tourism and local development: The role of universities	Sustainability (Switzerland)
27	0.47	2019	Lopes, B.; Sil	The 'lunar side' of the story: Exploring the sustainability of curricular internships in higher education	Sustainability (Switzerland)
28	0.37	2017	Tan, A.; Ude	Sustainable development in a construction related curriculum–quantity surveying students' perspectiv	International Journal of Strategic Property Management
29	0.37	2020	Abubakar, I.	Sustainable development at Saudi Arabian universities: An overview of institutional frameworks	Sustainability (Switzerland)
30	0.29	2016	Gustavo De	A sustainability evaluation framework for Science and Technology Institutes: An international compara	Journal of Cleaner Production
31	0.23	2018	Hardy, S.E.;	Introducing a People's Academy into Higher Education a coproduction approach to sustained well-bein	Higher Education, Skills and Work-based Learning
32	0.23	2019	Mion, G.; Br	Do codes of ethics reveal a university's commitment to sustainable development? Evidence from Italy	Sustainability (Switzerland)
33	0.00	2019	Yaacob, A.; A	Illuminating diversity practices in malaysian higher education institutions	Asia Pacific Journal of Educators and Education
34	?	2019	Williams, I.;	Sustainable resource management by students at higher education institutions	Detritus
35	?	2020	Pacheco, J.A	Sustainable development in the economic, environmental, and social fields of ecuadorian universities	Sustainability (Switzerland)
36	?	2020	Snyder, K.; K	Sustainability Reporting at Universities with Multiple Platforms	Sustainability (United States)
37	?	2020	Yüksel, F.	Sustainability in accounting education given by Turkey higher education institutions	Turkish Online Journal of Qualitative Inquiry

Figure 6: FWCI ranking & elimination[49]

Appendix 2: Journal Quality Assesment

Relevant
Not relevant

#	h-index	Publication Year	Author	Title	Publication Title
1	173	2019	Vargas, V.R.	Sustainable development stakeholder networks for organisational change in higher education instituti	Journal of Cleaner Production
2	173	2019	Leal Filho, W	The role of higher education institutions in sustainability initiatives at the local level	Journal of Cleaner Production
3	173	2017	Berzosa, A.;	Sustainability assessment tools for higher education: An empirical comparative analysis	Journal of Cleaner Production
4	97	2018	Sales de Agu	Sustainability on campus: knowledge creation through social and environmental reporting	Studies in Higher Education
5	78	2017	Versteijlen, I	Pros and cons of online education as a measure to reduce carbon emissions in higher education in the	Current Opinion in Environmental Sustainability
6	68	2020	Caeiro, S.; H	Sustainability assessment and benchmarking in higher education institutions-a critical reflection	Sustainability (Switzerland)
7	68	2020	Filho, W.L.; I	Sustainability leadership in higher education institutions: An overview of challenges	Sustainability (Switzerland)
8	68	2018	Findler, F.; S	Assessing the impacts of higher education institutions on sustainable development-an analysis of tools	Sustainability (Switzerland)
9	68	2019	Farinha, C.; I	Sustainability strategies in Portuguese higher education institutions: Commitments and practices from	Sustainability (Switzerland)
10	68	2020	Schopp, K.; E	The whole-institution approach at the University of Tubingen: Sustainable development set in practice	Sustainability (Switzerland)
11	68	2018	Blanco-Porte	Sustainability leaders' perceptions on the drivers for and the barriers to the integration of sustainabilit	Sustainability (Switzerland)
12	68	2020	Romero, S.;	Systematic review of how engineering schools around the world are deploying the 2030 agenda	Sustainability (Switzerland)
13	68	2016	Abubakar, I.	Students' assessment of campus sustainability at the University of Dammam, Saudi Arabia	Sustainability (Switzerland)
14	55	2020	Finnveden, G	Evaluation of integration of sustainable development in higher education in Sweden	International Journal of Sustainability in Higher Education
15	55	2019	Strachan, S.I	Using Vertically Integrated Projects to embed research-based education for sustainable development i	International Journal of Sustainability in Higher Education
16	25	2017	Tapia-Fonlle	Education for sustainable development in higher education institutions: Its influence on the pro-sustai	SAGE Open
17	24	2019	Hassan, A.; A	Integrated reporting in UK higher education institutions	Sustainability Accounting, Management and Policy Journal
18	18	2020	Popescu, F.;	How do students assess the sustainability of their university? A comparison between dutch and roman	Amfiteatru Economic
19	17	2017	Leal Filho, W	Identifying and overcoming obstacles to the implementation of sustainable development at universitie	Journal of Integrative Environmental Sciences

Figure 7: h-index ranking & elimination[50]

[49] Own representation
[50] Own representation

Appendix 3: List of HEIs

#	Name	Country	Sustainability Report?
1	Academy of Fine Arts Vienna	AT	Yes
2	Johannes Kepler University Linz	AT	No
3	University of Music and Performing Arts Graz	AT	No
4	Medical University of Graz	AT	No
5	Medical University of Innsbruck	AT	No
6	Medical University of Vienna	AT	No
7	Leoben University Mining and Metallurgy	AT	No
8	Vienna University of Technology	AT	No
9	Graz University of Technology	AT	Yes
10	University of Applied Arts Vienna	AT	No
11	University of Natural Resources and Life Sciences Vienna	AT	Yes
12	The University of Art and Design Linz	AT	No
13	University of Music and Performing Arts Vienna	AT	No
14	University of Graz	AT	Yes
15	University of Innsbruck	AT	No
16	University of Klagenfurt	AT	No
17	Mozarteum University	AT	No
18	Paris Lodron University of Salzburg	AT	No
19	University of Vienna	AT	No
20	University of Veterinary Medicine Vienna	AT	No
21	Vienna University of Economics and Business	AT	No
22	Danube University Krems	AT	No
23	University of Bern	CH	Yes
24	University of Basel	CH	No
25	University of Fribourg	CH	No
26	University of Geneva	CH	No
27	University of Neuchâtel	CH	No
28	University of Lausanne	CH	No
29	University of Lucerne	CH	No
30	University of Lugano (Università della Svizzera italiana (USI	CH	No
31	University of St. Gallen	CH	No
32	University of Zurich	CH	Yes
33	Swiss Federal Institute of Technology Lausanne (EPFL)	CH	No
34	Swiss Federal Institute of Technology Zurich ETH	CH	Yes
35	University of Freiburg	DE	No
36	Heidelberg University	DE	No
37	University of Mannheim	DE	No
38	University of Hohenheim	DE	No
39	Karlsruhe Institute of Technology	DE	No
40	University of Konstanz	DE	Yes
41	University of Stuttgart	DE	No
42	University of Tübingen	DE	No
43	Ulm University	DE	No
44	Augsburg University	DE	No
45	University of Bamberg	DE	No
46	University of Bayreuth	DE	Yes
47	Friedrich-Alexander University Erlangen-Nürnberg	DE	No
48	Ludwig-Maximillian University Munich	DE	No
49	Technical University of Munich	DE	No
50	Bundeswehr University Munich	DE	No
51	The Bavarian School of Public Policy	DE	No
52	The University of Passau	DE	No
53	University of Regensburg	DE	No
54	University of Würzburg	DE	No
55	Free University of Berlin	DE	Yes
56	Technical University of Berlin	DE	Yes
57	Charité - Berlin University of Medicine	DE	No
58	Humboldt University of Berlin	DE	No
59	Film University Babelsberg KONRAD WOLF	DE	No
60	Brandenburg University of Technology	DE	No
61	Europan University Viadrina	DE	No
62	University of Potsdam	DE	No
63	The University of Bremen	DE	Yes
64	University of Hamburg	DE	Yes
65	Hamburg University of Technology	DE	No
66	HafenCity University Hamburg	DE	No
67	Helmut Schmidt University	DE	No
68	TU Darmstadt	DE	No
69	Goethe University Frankfurt	DE	No
70	Giessen University	DE	No
71	University of Kassel	DE	Yes
72	Philipps University of Marburg	DE	No
73	University of Greifswald	DE	No
74	University of Rostock	DE	No
75	TU Braunschweig	DE	No
76	Clausthal University of Technology	DE	No
77	The University of Göttingen	DE	No
78	Leibniz University Hannover	DE	No
79	Hannover Medical School	DE	No
80	University of Veterinary Medicine Hannover	DE	No
81	University of Hildesheim	DE	No
82	Leuphana University Lüneburg	DE	Yes
83	The Carl von Ossietzky University of Oldenburg	DE	Yes
84	Osnabrück University	DE	No
85	University of Vechta	DE	No
86	RWTH Aachen	DE	No
87	Bielefeld University	DE	No
88	Ruhr-University Bochum	DE	No
89	The University of Bonn	DE	No
90	TU Dortmund University	DE	No
91	Heinrich Heine University Düsseldorf	DE	No
92	The University of Duisburg-Essen	DE	Yes
93	The University of Hagen (Fernuniversität in Hagen)	DE	No
94	University of Cologne	DE	No
95	The German Sport University Cologne	DE	No
96	The University of Münster	DE	No
97	German Police University	DE	No
98	Paderborn University	DE	No
99	University of Siegen	DE	No
100	University of Wuppertal	DE	No
101	The University of Kaiserlautern (TU)	DE	No
102	The University of Koblenz-Landau	DE	No
103	Mainz University	DE	No
104	The German University of Administrative Sciences Speyer	DE	No
105	Trier University	DE	No
106	Saarland University	DE	No
107	Chemnitz University of Technology	DE	No
108	TU Dresden	DE	No
109	TU Bergakademie Freiberg - University of Resources	DE	No
110	Leipzig University	DE	No
111	Martin Luther University of Halle-Wittenberg	DE	No
112	Otto von Guericke University Magdeburg	DE	No
113	The University of Flensburg	DE	No
114	Kiel University (CAU)	DE	No
115	The University of Lübeck	DE	No
116	University of Erfurt	DE	No
117	Ilmenau University of Technology	DE	No
118	Friedrich Schiller University Jena	DE	No
119	The Bauhaus-Universität Weimar	DE	No

Figure 8: List of all HEIs in the DACH-region[51]

[51] Own representation

Appendix 4: Numbering of HEIs

#	Name	Country
1	Graz University of Technology	AT
2	University of Natural Resources and Life Sciences Vienna	AT
3	University of Bern	CH
4	University of Zurich	CH
5	Swiss Federal Institute of Technology Zurich ETH	CH
6	University of Konstanz	DE
7	Free University of Berlin	DE
8	Technical University of Berlin	DE
9	University of Kassel	DE
10	Leuphana University Lüneburg	DE
11	The Carl von Ossietzky University of Oldenburg	DE
12	The University of Duisburg-Essen	DE

Figure 9: Numbering of HEIs for benchmarking analysis[52]

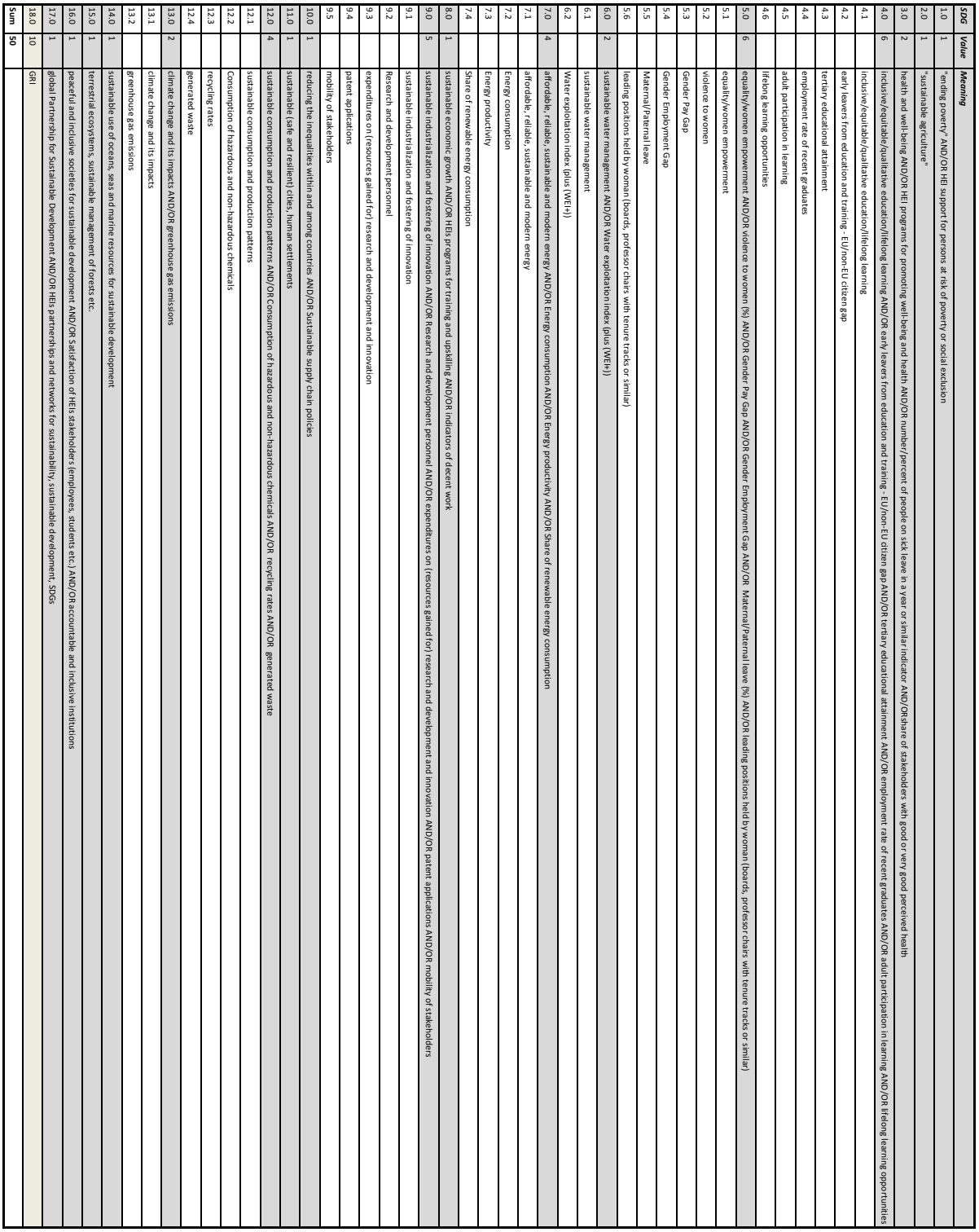
Appendix 5: Results of benchmarking analysis

#	GRI	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17	Sum
1	0	0	2	2	4	2	4	3	4	3	0	3	3	0	0	0	0	3	**33**
2	4	3	3	4	2	2	3	4	1	3	4	4	4	4	1	4	1	2	**53**
3	0	0	0	3	3	4	2	3	4	1	0	0	0	2	0	1	1	1	**25**
4	4	0	0	3	4	2	4	4	4	4	2	4	4	4	0	3	3	4	**53**
5	4	2	2	3	4	4	4	4	4	4	3	4	2	4	0	1	2	4	**55**
6	0	0	2	3	3	3	2	3	3	1	2	2	1	2	0	2	2	3	**34**
7	0	1	1	2	4	2	1	2	2	3	2	3	1	4	0	3	4	1	**36**
8	0	3	1	4	4	4	4	4	4	4	3	4	4	4	2	3	4	4	**60**
9	0	0	0	4	4	4	3	3	3	3	4	1	3	4	0	1	2	3	**42**
10	0	0	0	3	2	4	2	3	3	1	2	2	3	3	0	3	3	4	**38**
11	4	1	3	3	4	3	3	4	3	2	3	2	2	4	2	1	2	4	**50**
12	2	0	2	4	4	4	4	4	2	3	3	2	3	4	2	2	3	4	**52**
Sum	18	10	16	38	42	38	36	41	37	32	28	31	30	39	7	24	27	37	

Figure 10: Results of SDG&GRI analysis[53]

[52] Own representation
[53] Own representation

Appendix 6: List of SDGs including subtargets



SDG	Value	Meaning
1.0	1	"ending poverty" AND/OR HEI support for persons at risk of poverty or social exclusion
2.0	1	"sustainable agriculture"
3.0	2	health and well-being AND/OR HEI programs for promoting well-being and health AND/OR number/percent of people on sick leave in a year or similar indicator AND/OR share of stakeholders with good or very good perceived health
4.0	6	inclusive/equitable/qualitative education/lifelong learning AND/OR early leavers from education and training - EU/non-EU citizen gap AND/OR tertiary educational attainment AND/OR employment rate of recent graduates AND/OR adult participation in learning AND/OR lifelong learning opportunities
4.1		inclusive/equitable/qualitative education/lifelong learning
4.2		early leavers from education and training - EU/non-EU citizen gap
4.3		tertiary educational attainment
4.4		employment rate of recent graduates
4.5		adult participation in learning
4.6		lifelong learning opportunities
5.0	6	equality/women empowerment AND/OR violence to women (%) AND/OR Gender Pay Gap AND/OR Gender Employment Gap AND/OR Maternal/Paternal leave (%) AND/OR leading positions held by woman (boards, professor chairs with tenure tracks or similar)
5.1		equality/women empowerment
5.2		violence to women
5.3		Gender Pay Gap
5.4		Gender Employment Gap
5.5		Maternal/Paternal leave
5.6		leading positions held by woman (boards, professor chairs with tenure tracks or similar)
6.0	2	sustainable water management AND/OR Water exploitation index (plus (WEI+))
6.1		sustainable water management
6.2		Water exploitation index (plus (WEI+))
7.0	4	affordable, reliable, sustainable and modern energy AND/OR Energy consumption AND/OR Energy productivity AND/OR Share of renewable energy consumption
7.1		affordable, reliable, sustainable and modern energy
7.2		Energy consumption
7.3		Energy productivity
7.4		Share of renewable energy consumption
8.0	1	sustainable economic growth AND/OR HEIs programs for training and upskilling AND/OR indicators of decent work
9.0	5	sustainable industrialization and fostering of innovation AND/OR Research and development personnel AND/OR expenditures on (resources gained for) research and development and innovation AND/OR patent applications AND/OR mobility of stakeholders
9.1		sustainable industrialization and fostering of innovation
9.2		Research and development personnel
9.3		expenditures on (resources gained for) research and development and innovation
9.4		patent applications
9.5		mobility of stakeholders
10.0	1	reducing the inequalities within and among countries AND/OR Sustainable supply chain policies
11.0	1	sustainable (safe and resilient) cities, human settlements
12.0	4	sustainable consumption and production patterns AND/OR Consumption of hazardous and non-hazardous chemicals AND/OR recycling rates AND/OR generated waste
12.1		sustainable consumption and production patterns
12.2		Consumption of hazardous and non-hazardous chemicals
12.3		recycling rates
12.4		generated waste
13.0	2	climate change and its impacts AND/OR greenhouse gas emissions
13.1		climate change and its impacts
13.2		greenhouse gas emissions
14.0	1	sustainable use of oceans, seas and marine resources for sustainable development
15.0	1	terrestrial ecosystems, sustainable management of forests etc.
16.0	1	peaceful and inclusive societies for sustainable development AND/OR Satisfaction of HEIs stakeholders (employees, students etc.) AND/OR accountable and inclusive institutions
17.0	1	global Partnership for Sustainable Development AND/OR HEIs partnerships and networks for sustainability, sustainable development, SDGs
18.0	10	GRI
Sum	50	

Figure 11: List of SDGs including subtargets[54]

[54] Own representation

Appendix 7: List of all indicators

List of indicators for 2020 monitoring report

For legend & explanations: Please refer to the work sheet "Read me first"! | List is "ready to print" in A4

Exclude targets that are primarily aimed at governmental actions

Irrelevant for HEIs

Goal	*Code*	*MPI*	*Indicator name*	*Unit(s)*	*Frequency of data collection*	*Geographical coverage*	*Data source*	*Data provider*
1	**Goal 1. End poverty in all its forms everywhere**							
1	01_10		People at risk of poverty or social exclusion	% of population and thousand persons	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_10a (added)	mpi -> 10	People at risk of poverty or social exclusion - urban/rural gap	% of population i. in cities ii. in towns and suburbs iii. in rural areas	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_20		People at risk of income poverty after social transfers	% of population and thousand persons	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_20a (added)	mpi -> 10	People at risk of income poverty after social transfers - EU/non-EU citizen gap	% of population aged 18 years or more i. citizen of reporting country ii. non EU citizen	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_30		Severely materially deprived people	% of population and thousand persons	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_40		People living in households with very low work intensity	% of population aged less than 60 and thousand persons	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_41	mpi -> 8	In work at-risk-of-poverty rate	% of employed persons aged 18 or over	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
1	01_60	mpi -> 11	Population living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in window frames or floor	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
2	**Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture**							
2	02_10	mpi -> 3	Obesity rate	% of population aged 18 or over i. overweight (BMI>25) ii. pre-obese (BMI 25-30) iii. obese (BMI>30)	more than 3 years	EU aggregate and all MS; plus other countries	ESS (EHIS)	Eurostat
2	02_20		Agricultural factor income per annual work unit (AWU)	Index 2010 = 100 and Chain linked volumes (2010) in EUR	every year	EU aggregate and all MS; plus other countries	1	DG AGRI
2	02_30		Government support to agricultural research and development	million EUR and EUR per capita (current prices)	every year	EU aggregate and all MS; plus other countries	ESS (GBAORD)	Eurostat
2	02_40		Area under organic farming	% of total utilised agricultural area (UAA)	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
2	02_51 (new)		Harmonised risk indicator for pesticides (HRI1)	Index 2011-2013 = 100	every year	Only EU aggregate	Calculation based on annex IV (Section 2) of Commission Directive (EU) 2019/782	DG SANTE

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Figure 12: List of all indicators 1/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
2	02_60		Ammonia emissions from agriculture	tonnes and kg per hectare utilised agricultural area (UAA)	every year	EU aggregate and all MS; plus other countries	Reporting under National Emission Ceilings Directive (NECD) and Convention on Long-range Transboundary Air Pollution (CLRTAP)	EEA
3	**Goal 3. Ensure healthy lives and promote well-being for all at all ages**							
3	03_10		Life expectancy at birth	years i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
3	03_20		Share of people with good or very good perceived health	% of population aged 16 or over i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
3	03_30		Smoking prevalence	% of population aged 15 or over i. total ii. males iii. females	every 3 years	EU aggregate and all MS	Eurobarometer	DG SANTE
3	03_41		Standardised death rate due to tuberculosis, HIV and hepatitis	number per 100 000 persons i. total ii. tuberculosis iii. hepatitis iv. HIV	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
3	03_42 (new)		Standardised avoidable mortality	number per 100 000 persons aged less than 75 years i. total ii. preventable mortality iii. treatable mortality	every year	EU aggregate & all MS; plus other countries	ESS	Eurostat
3	03_60	mpi -> 1	Self-reported unmet need for medical care	% of population aged 16 and over i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
4	**Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**							
4	04_10	mpi -> 5	Early leavers from education and training	% of population aged 18 to 24 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
4	04_10a (added)	mpi -> 10	Early leavers from education and training - EU/non-EU citizen gap	% of population aged 18 to 24 i. citizen of reporting country ii. non EU citizen	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
4	04_20	mpi -> 5	Tertiary educational attainment	% of population aged 30 to 34 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat

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Figure 13: List of all indicators 2/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
4	04_30		Participation in early childhood education	% of children between 4-years-old and the starting age of compulsory education i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
4	04_40		Underachievement in reading, maths and science	% of 15-year-old students i. reading ii. maths iii. science	every 3 years	EU aggregate and all MS; plus other countries	PISA	OECD
4	04_50	mpi -> 5	Employment rate of recent graduates	% of population aged 20 to 34 with at least upper secondary education i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
4	04_60		Adult participation in learning	% of population aged 25 to 64 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
5	**Goal 5. Achieve gender equality and empower all women and girls**							
5	05_10		Physical and sexual violence to women	% of women i. age 15-74 ii. age 18-29 iii. age 30-39 iv. age 40-49 v. age 50-59 vi. age 60+	a-periodic	EU aggregate and all MS	http://fra.europa.eu/en/publications-and-resources/data-and-maps/survey-data-explorer-violence-against-women-survey	DG JUST; EU Agency for Fundamental Rights
5	05_20		Gender pay gap in unadjusted form	% of average gross hourly earnings of men	every year	EU aggregate and most MS; plus other countries	ESS (SES)	Eurostat
5	05_30		Gender employment gap	Percentage points	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
5	05_40	mpi -> 8	Inactive population due to caring responsibilities	% of inactive population aged 20 to 64 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
5	05_50		Seats held by women in national parliaments and governments	% of seats i. national parliaments ii. national governments	every year	EU aggregate and all MS; plus other countries	The Gender Statistics Database (GSD)	EIGE
5	05_60		Positions held by women in senior management	% of positions i. board members ii. executives	every year	EU aggregate and all MS; plus other countries	The Gender Statistics Database (GSD)	EIGE
6	**Goal 6. Ensure availability and sustainable management of water and sanitation for all**							
6	06_10	mpi -> 1	Population having neither a bath, nor a shower, nor indoor flushing toilet in their household	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and most MS; plus other countries	ESS (SILC)	Eurostat

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Figure 14: List of all indicators 3/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
6	06_20	mpi -> 11	Population connected to at least secondary waste water treatment	% of population	every year	No EU aggregate but many MS; plus other countries	OECD/ESTAT joint questionnaire	Eurostat
6	06_30	mpi -> 15	Biochemical oxygen demand in rivers	mg O2 per litre	every year	EU aggregate and most MS; plus other countries	WISE-4 Waterbase	EEA
6	06_40	mpi -> 2	Nitrate in groundwater	mg NO3 per litre	every year	EU aggregate and some MS; plus other countries	WISE-4 Waterbase	EEA
6	06_50	mpi -> 15	Phosphate in rivers	mg PO4 per litre	every year	EU aggregate and most MS; plus other countries	WISE-4 Waterbase	EEA
6	06_60		Water exploitation index, plus (WEI+)	% of long term average available water (LTAA)	every year	EU aggregate and all MS; plus other countries	Waterbase - Water Quantity	EEA, data collected by Eurostat
7	**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all**							
7	07_10		Primary & final energy consumption	million tonnes of oil equivalent, index 2005 = 100 and tonnes of oil equivalent per capita	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
7	07_20		Final energy consumption in households per capita	kg of oil equivalent	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
7	07_30	mpi -> 12	Energy productivity	Chain linked volumes (2010) in EUR and PPS per kg of oil equivalent	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
7	07_40	mpi -> 13	Share of renewable energy in gross final energy consumption	% i. all sectors ii. transport iii. electricity iv. heating and cooling	every year	EU aggregate and all MS; plus other countries	ESS (SHARES)	Eurostat
7	07_50		Energy import dependency	% of imports in total gross available energy i. all products ii. solid fossil fuels iii. total petroleum products iv. natural gas	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
7	07_60	mpi -> 1	Population unable to keep home adequately warm	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
8	**Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**							
8	08_10		Real GDP per capita	Chain linked volumes (2010) in EUR and % change on previous year	every year	EU aggregate and all MS; plus other countries	ESS (National accounts)	Eurostat
8	08_11		Investment share of GDP	% of GDP i. Total investment ii. Business investment iii. Government investment iv. Households investments	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat

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Figure 15: List of all indicators 4/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
8	08_20		Young people neither in employment nor in education and training	% of population aged 15 to 29 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
8	08_20a (added)	mpi -> 10	Young people neither in employment nor in education and training - EU/non-EU citizen gap	% of population aged 15 to 29 i. citizen of reporting country ii. non EU citizen	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
8	08_30		Employment rate	% of population aged 20 to 64 i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
8	08_30a (added)	mpi -> 10	Employment rate - EU/non-EU citizen gap	% of population aged 20 to 64 i. citizen of reporting country ii. non EU citizen	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
8	08_40		Long-term unemployment rate	% of active population i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (LFS)	Eurostat
8	08_60	mpi -> 3	People killed in accidents at work	number per 100 000 employees i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS (ESAW)	Eurostat
9	**Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**							
9	09_10		Gross domestic expenditure on R&D	% of GDP i. total ii. business enterprise sector iii. government sector iv. higher education sector v. private non-profit sector	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
9	09_21 (new)		Human resources in science and technology	% of active population aged 25 to 64	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
9	09_30		R&D personnel	% of active population i. total ii. business enterprise sector iii. government sector iv. higher education sector v. private non-profit sector	every year	EU aggregate and all MS; plus other countries	OECD/ESTAT joint questionnaire	Eurostat
9	09_40		Patent applications to the European Patent Office (EPO)	total number and number per million inhabitants	every year	EU aggregate and all MS; plus other countries	EPO annual reports	EPO
9	09_50	mpi -> 11	Share of busses and trains in total passenger transport	% of total inland passenger-kilometres i. all collective transport modes ii. trains iii. motor coaches, buses and trolley buses	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat

5/9

Figure 16: List of all indicators 5/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
9	09_60		Share of rail and inland waterways in total freight transport	% of total inland tonne-kilometres i. all railways and inland waterways ii. railways iii. inland waterways	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
10	**Goal 10. Reduce inequality within and among countries**							
10	10_10		Purchasing power adjusted GDP per capita	PPS (current prices), index EU27 = 100 and coefficient of variation	every year	EU aggregate and all MS; plus other countries	ESS (National accounts)	Eurostat
10	10_20		Gross disposable income of households per capita	PPS (current prices) and index EU28 = 100	every year	EU aggregate and most MS; plus other countries	ESS	Eurostat
10	10_30		Relative median at-risk-of-poverty gap	% distance to poverty threshold	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
10	10_41		Income distribution	Quintile share ratio	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
10	10_50		Income share of the bottom 40 % of the population	% of income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
10	10_60		Asylum applications	number per million inhabitants i. first time application ii. positive first instance decision	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
11	**Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable**							
11	11_10	mpi -> 1	Overcrowding rate	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
11	11_20	mpi -> 3	Population living in households considering that they suffer from noise	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
11	11_31		Settlement area per capita	square meters per capita	every 3 years	EU aggregate and all MS	ESS (LUCAS)	Eurostat
11	11_40	mpi -> 3	People killed in road accidents	persons and number per 100 000 persons	every year	EU aggregate and all MS; plus other countries	CARE database	DG MOVE
11	11_50	mpi -> 3	Exposure to air pollution by particulate matter	µg/m3 i. particulates <2.5µm ii. particulates <10µm	every year	EU aggregate and most MS; plus other countries	Air Quality e-Reporting	EEA
11	11_60		Recycling rate of municipal waste	% of total waste generated	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
12	**Goal 12. Ensure sustainable consumption and production patterns**							

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Figure 17: List of all indicators 6/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
12	12_10		Consumption of hazardous and non-hazardous chemicals	million tonnes i. hazardous and non-hazardous - total ii. hazardous total iii. hazardous to health iv. hazardous to environment	every year	Only EU aggregate; no MS data available.	ESS (PRODCOM; COMEXT)	Eurostat
12	12_20	mpi -> 8	Resource productivity and domestic material consumption (DMC)	EUR (chain linked volumes, 2010) per kg DMC; index 2000 = 100; PPS per kg DMC and thousand tonnes DMC	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
12	12_30	mpi -> 9; 13	Average CO2 emissions per km from new passenger cars	g CO2 per km	every year	EU aggregate and all MS	Reporting under Regulation (EC) No 443/2009	EEA / DG CLIMA
12	12_41		Circular material use rate	% of total material use	every year	EU aggregate and all MS	ESS	Eurostat
12	12_50		Generation of waste excluding major mineral wastes	kg per capita i. hazardous and non-hazardous - total ii. hazardous iii. non-hazardous	every 2 years	EU aggregate and all MS; plus other countries	ESS	Eurostat
12	12_61 (new)		Gross value added in environmental goods and services sector	Chain linked volumes (2010) in EUR and % of GDP	every year	EU aggregate and most MS; plus other countries	ESS	Eurostat
13	**Goal 13. Take urgent action to combat climate change and its impacts**							
13	13_10		Greenhouse gas emissions	index 1990 = 100 and tonnes of CO2 equivalent per capita	every year	EU aggregate and all MS; plus other countries	UNFCCC reporting	EEA
13	13_20	mpi -> 7	Greenhouse gas emissions intensity of energy consumption	index 2000 = 100	every year	EU aggregate and all MS; plus other countries	UNFCCC reporting and EU Greenhouse Gas Monitoring Mechanism	EEA; Eurostat
13	13_30		Mean near-surface temperature deviation	Degree Celsius (annual/decadal) of global and European temperature deviation i. HadCRUT4 ii. GISSTEMP iii. NOAA Global Temp	every year	Not applicable	Met Office HC; NASA-GISS; NOAA-NCEI	EEA
13	13_40		Climate-related economic losses	million EUR and EUR per capita (current prices) i. Losses - all events ii. Losses - meteorological events iii. Losses - hydrological events iv. Losses - climatological events v. Losses - 30-year average	not specified	Only EU aggregate; no MS data available.	Munich Re	EEA
13	13_50		Contribution to the international 100bn USD commitment on climate related expending	million EUR (current prices) and EUR per capita	every year	EU aggregate and most MS; plus other countries	Monitoring Mecanism Regulation (MMR) 525/2013	DG CLIMA; Eionet
13	13_60		Population covered by the Covenant of Mayors for Climate and Energy signatories	million persons and % of population	every year	EU aggregate and all MS; plus other countries	CoMo	JRC
14	**Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development**							

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Figure 18: List of all indicators 7/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
14	14_10		Surface of marine sites designated under Natura 2000	km2	every year	EU aggregate and all MS (except landlocked)	ETC/BD	EEA
14	14_21		Estimated trends in fish stock biomass	i. Number of fish stocks assessed ii. Biomass index 2003 = 100	every year	No EU aggregate; for MS not applicable (only FAO fishing areas)		JRC (STECF)
14	14_30		Assessed fish stocks exceeding fishing mortality at maximum sustainable yield (Fmsy)	i. Number of assessed fish stocks ii. Number of overfished fish stocks iii. % of overfished fish stocks iv. Model based median value of all assessments	every year	No EU aggregate; for MS not applicable (only FAO fishing areas)		JRC (STECF)
14	14_40	mpi -> 6	Bathing sites with excellent water quality	Number and % of bathing sites i. coastal water ii. inland water	every year	EU aggregate and all MS (coastal water: except landlocked)	EEA	EEA
14	14_50	mpi -> 13	Mean ocean acidity	pH value	every year	Not applicable	CMEMS	CMEMS (through Mercator Ocean International)
15	**Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**							
15	15_10		Share of forest area	% of total land area i. all forest area FAO ii. forest FAO iii. other wooded land FAO	every 3 years	EU aggregate and all MS	ESS (LUCAS)	Eurostat
15	15_20		Surface of terrestrial sites designated under Natura 2000	km2 and terrestrial protected area (%)	every year	EU aggregate and all MS	ETC/BD	EEA
15	15_41		Soil sealing index	index 2006 = 100; % of total surface; km2 of sealed surface	every 3 years	EU aggregate and all MS	Copernicus HRL	EEA
15	15_50	mpi -> 2	Estimated soil erosion by water - area affected by severe erosion rate	km2 and % of potential erosive area	a-periodic	EU aggregate and all MS	Soil erosion database	JRC
15	15_60	mpi -> 2	Common bird index	index 2000=100 and index 1990=100 i. all common species ii. common farmland species iii. common forest species	every year	Only EU aggregate; no MS data available.	EBCC/RSPB/BirdLife/Czech Society for Ornithology	European Bird Census Council
15	15_61		Grassland butterfly index	index 2000 = 100 and index 1990 = 100	every year	Only EU aggregate; no MS data available.	BMS (Butterfly M	EEA (Butterfly Conservation Europe)
16	**Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**							
16	16_10		Standardised death rate due to homicide	number per 100 000 persons i. total ii. males iii. females	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat

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Figure 19: List of all indicators 8/9

Goal	Code	MPI	Indicator name	Unit(s)	Frequency of data collection	Geographical coverage	Data source	Data provider
16	16_20	mpi -> 11	Population reporting occurrence of crime, violence or vandalism in their area	% of population i. total ii. below 60% of median equivalised income iii. above 60% of median equivalised income	every year	EU aggregate and all MS; plus other countries	ESS (SILC)	Eurostat
16	16_30		General government total expenditure on law courts	million EUR and EUR per capita (current prices)	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat
16	16_40		Perceived independence of the justice system	% of population i. very good or fairly good ii. very good iii. fairly good iv. very bad or fairly bad v. very bad vi. fairly bad vii. unknown	every year	EU aggregate and all MS	Eurobarometer	DG COMM
16	16_50		Corruption Perceptions Index	Score scale of 0 (highly corrupt) to 100 (very clean)	every year	No EU aggregate, but all MS plus other countries	http://www.transparency.org/research/cpi/overview	Transparency International
16	16_60		Population with confidence in EU institutions	% of population i. European Parliament ii. European Commission iii. European Central Bank	every year	EU aggregate and all MS; plus other countries	Eurobarometer	DG COMM
17	**Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development**							
17	17_10		Official development assistance as share of gross national income	% of GNI (at current prices)	every year	EU aggregate and all MS; plus other countries	OECD database	OECD (DAC)
17	17_20		EU financing to developing countries	million EUR (current prices) i. official development assistance ii. grants by NGOs iii. private flows iv. other official flows v. officially supported export credits	every year	EU aggregate and all MS; plus other countries	OECD database	OECD (DAC)
17	17_30		EU imports from developing countries	million EUR (current prices) i. DAC countries ii. least developed countries iii. lower middle income countries iv. other low income countries v. upper middle income countries excl. China vi. China (excl. Hong Kong)	every year	EU aggregate and all MS	ESS	Eurostat
17	17_40		General government gross debt	% of GDP and million EUR (current prices)	every year	EU aggregate and all MS	ESS	Eurostat
17	17_50		Shares of environmental taxes in total tax revenues	% (current prices)	every year	EU aggregate and all MS; plus other countries	ESS	Eurostat

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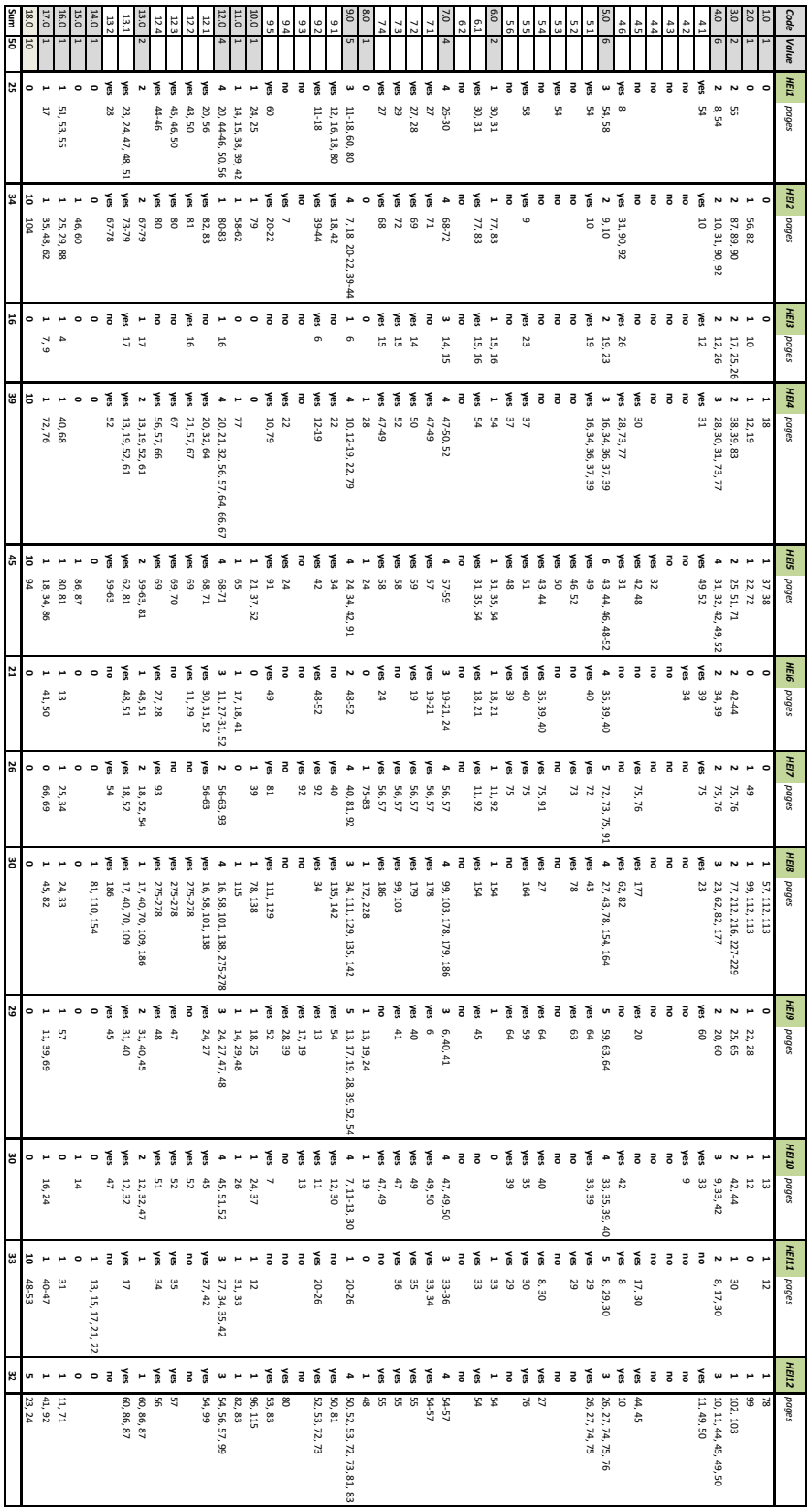
Figure 20: List of all indicators 9/9[55]

[55] Figure 12-20: Own representation

Appendix 8: Results of Target analysis



Code	Value	HEI1	pages	HEI2	pages	HEI3	pages	HEI4	pages	HEI5	pages	HEI6	pages	HEI7	pages	HEI8	pages	HEI9	pages	HEI10	pages	HEI11	pages	HEI12	pages
1.0	1	0		0		0		0		1	37,38	0		0		1	57,112,113	0		1	13	1	12	1	78
2.0	1	0		1	56,82	1	10	1	18	1	22,72	0		1	49	1	99,112,113	1	22,28	1	12	0		1	99
3.0	2	2	55	2	87,89,90	2	17,25,26	1	12,19	2	25,51,71	2	42-44	2	75,76	2	77,212,216,227-229	2	25,65	2	42,44	1	30	1	102,103
4.0	6	2	8,54	2	10,31,90,92	2	12,26	3	28,30,31,73,77	4	31,32,42,49,52	2	34,39	2	75,76	3	23,62,82,177	2	20,60	3	9,33,42	2	8,17,30	3	10,11,44,45,49,50
4.1		yes	54	yes	10	yes	12	yes	31	yes	49,52	yes	39	yes	75	yes	23	yes	60	yes	33	no		yes	11,49,50
4.2		no		no		no		no		no		yes	34	no		no		no		yes	9	no		no	
4.3		no		no		no		no		no		no		no		no		no		no		no		no	
4.4		no		no		no		no		no	32	no		no		no		no		no		no		no	
4.5		no		no		no		yes	30	yes	42,48	no		yes	75,76	yes	177	yes	20	no		yes	17,30	yes	44,45
4.6		yes	8	yes	31,90,92	yes	26	yes	28,73,77	yes	31	no		no		yes	62,82	no		yes	42	yes	8	yes	10
5.0	6	3	54,58	2	9,10	2	19,23	3	16,34,36,37,39	6	43,44,46,48-52	4	35,39,40	5	72,73,75,91	4	27,43,78,154,164	5	59,63,64	4	33,35,39,40	5	8,29,30	3	26,27,74,75,76
5.1		yes	54	yes	10	yes	19	yes	16,34,36,37,39	yes	49	yes	40	yes	72	yes	43	yes	64	yes	33,39	yes	29	yes	26,27,74,75
5.2		no		no		no		no		yes	46,52	no		yes	73	yes	78	yes	63	no		yes	29	no	
5.3		yes	54	no		no		no		yes	50	no		no		no		no		no		no		no	
5.4		no		no		no		no		yes	43,44	yes	35,39,40	yes	75,91	yes	27	yes	64	yes	40	yes	8,30	yes	27
5.5		yes	58	yes	9	yes	23	yes	37	yes	51	yes	40	yes	75	yes	164	yes	59	yes	35	yes	30	yes	76
5.6		no		no		no		yes	37	yes	48	yes	39	yes	75	no		yes	64	yes	39	yes	29	no	
6.0	2	1	30,31	1	77,83	1	15,16	1	54	1	31,35,54	1	18,21	1	11,92	1	154	1		0		1	33	1	54
6.1		yes	30,31	yes	77,83	yes	15,16	yes	54	yes	31,35,54	yes	18,21	yes	11,92	yes	154	yes	45	no		yes	33	yes	54
6.2		no		no		no		no		no		no		no		no		no		yes	47,49	no		no	
7.0	4	4	26-30	4	68-72	3	14,15	4	47-50,52	4	57,59	3	19-21,24	4	56,57	4	99,103,178,179,186	3	6,40,41	4	47,49,50	3	33-36	4	54-57
7.1		yes	27	yes	71	no		yes	47-49	yes	57	yes	19-21	yes	56,57	yes	178	yes	6	yes	49,50	yes	33,34	yes	54-57
7.2		yes	27,28	yes	69	yes	14	yes	50	yes	59	yes	19	yes	56,57	yes	179	yes	40	yes	49	yes	35	yes	55
7.3		yes	29	yes	72	yes	15	yes	52	yes	58	no		yes	56,57	yes	99,103	yes	41	yes	47	yes	36	yes	55
7.4		yes	27	yes	68	yes	15	yes	47-49	yes	58	yes	24	yes	56,57	yes	186	no		yes	47,49	no		yes	55
8.0	1	0		0		0		1	28	1	24	0		1	75-83	1	172,228	1	13,19,24	1	19	0		1	48
9.0	5	3	11-18,60,80	4	7,18,20-22,39-44	1	6	4	10,12-19,22,79	4	24,34,42,91	2	48-52	4	40,81,92	3	34,111,129,135,142	5	13,17,19,28,39,52,54	4	7,11-13,30	1	20-26	4	50,52,53,72,73,81,83
9.1		yes	12,16,18,80	yes	18,42	no		yes	22	yes	34	no		yes	40	yes	135,142	yes	54	yes	12,30	no		yes	50,81
9.2		yes	11-18	yes	39-44	yes	6	yes	12-19	yes	42	yes	48-52	yes	92	yes	34	yes	13	yes	11	yes	20-26	yes	52,53,72,73
9.3		no		no		no		no		no		no		yes	92	no		yes	17,19	yes	13	no		no	
9.4		no	60	yes	7	no		yes	22	yes	24	no		no	81	no	111,129	yes	28,39	no	7	no		yes	80
9.5		yes	60	yes	20-22	no		yes	10,79	yes	91	yes	49	yes	81	yes	111,129	yes	52	yes	24,37	no		yes	53,83
10.0	1	1	24,25	1	79	0		0		1	21,37,52	0		1	39	1	78,138	1	18,25	1	26	1	12	1	96,115
11.0	1	1	14,15,38,39,42	1	58-62	1	16	1	77	1	65	1	17,18,41	0		0	115	1	14,29,48	1	31,33	1	82,83		
12.0	4	4	20,44-46,50,56	1	80-83	1	16	4	20,21,32,56,57,64,66,67	4	68-71	3	11,27-31,52	2	56-63,93	4	16,58,101,138,275-278	3	24,27,47,48	4	45,51,52	3	27,34,35,42	3	54,56,57,99
12.1		yes	20,56	yes	82,83	no		yes	20,32,64	yes	68,71	yes	30,31,52	yes	56-63	yes	16,58,101,138	yes	24,27	yes	45	yes	27,42	yes	54,99
12.2		yes	43,50	yes	81	yes	16	yes	21,57,67	yes	69	yes	11,29	no		yes	275-278	no		yes	52	no		no	
12.3		yes	45,46,50	yes	80	no		yes	67	yes	69,70	no		yes	93	yes	275-278	yes	47	yes	52	yes	35	yes	57
12.4		yes	44-46	yes	80	no		yes	56,57,66	yes	69	yes	27,28	yes	18,52,54	yes	275-278	yes	48	yes	51	yes	34	yes	56
13.0	2	2	67-79	2	67-79	1	17	2	13,19,52,61	2	59-63,81	1	48,51	2	18,52,54	1	17,40,70,109,186	2	31,40,45	2	12,32,47	1		1	60,86,87
13.1		yes	23,24,47,48,51	yes	73-79	yes	17	yes	13,19,52,61	yes	62,81	yes	48,51	yes	18,52	yes	17,40,70,109	yes	31,40	yes	12,32	yes	17	yes	60,86,87
13.2		yes	28	yes	67,78	no		yes	52	yes	59-63	no		yes	54	yes	186	yes	45	yes	47	no		no	
14.0	1	0		0		0		0		1	86,87	0		0		1	81,110,154	0		1	14	0		1	11,71
15.0	1	0		1	46,60	0		1	40,68	0		1	13	0		0	24,33	1	57	0		1	31	1	41,92
16.0	1	1	51,53,55	1	25,29,88	1	4	1	72,76	1	80,81	1	41,50	0	66,69	1	45,82	1	11,39,69	1	16,24	0		1	23,24
17.0	1	1	17	1	35,48,62	1	7,9	1	72,76	1	18,34,86	1	41,50	0	66,69	1	45,82	0		1	16,24	1	40-47	1	41,92
18.0	10	0		10	104	0		10		10	94	0		0		0		0		0		10	48-53	5	23,24
Sum	50	25		34		16		39		45		21		26		30		29		30		33		32	

Figure 21: Results of Target analysis[56]

[56] Own representation