Excellence In Services International Conference
EISIC
Formerly Toulon-Verona Conference, founded in 1998

EISIC 25

Understanding University Sustainability - A preliminary study

Raine Isaksson
Department of Civil and Industrial Engineering
Uppsala University (Sweden)
Email raine.isaksson@angstrom.uu.se
Corresponding Author

Swaminathan Ramanathan
Department of Civil and Industrial Engineering
Uppsala University (Sweden)
Email swaminathan.ramanathan@angstrom.uu.se

Max Rosvall
Department of Civil and Industrial Engineering
Uppsala University (Sweden)
Email max.rosvall@angstrom.uu.se

Purpose of the paper*:* Understanding sustainability in higher education could be a challenge. Without an agreed understanding, measuring and improving performance become difficult. The purpose here is to explore how Diagnosing in a Sustainability Opportunity Study (SOS) could be understood for university education, research and societal co-operation. Further, the purpose is to propose how the SOS could be used to assess the level of university sustainability.

Methodology*:* The starting point is the Sustainability Opportunity Study (SOS) that describes how sustainability can be understood and operationalised based on an outside in stakeholder needs satisfaction focus. Focus is on Understanding-Defining-Measuring of Diagnosing. An important part in Understanding is viewing the organisational mission in terms of sustainability – doing the right thing in the value chain. The right thing is linked to global sustainability needs that the ethical and sustainable university strives to satisfy. An SOS for Diagnosing university sustainability is proposed as a conceptual benchmark. Further, the use of this benchmark for assessing university sustainability maturity is proposed.

Main Findings*:* The content of an SOS for university sustainability has been proposed based on identifying benchmarks for the processes of education, research and co-operation. Important sustainability goals are providing actor change competence, producing relevant sustainability research and supporting society in work towards sustainability.

Practical implications*:* Universities need to work on a better understanding of who the main customers/stakeholders for universities are.

Originality/value*:* Highlighting the importance of understanding sustainability in universities.

Type of paper*:* Conceptual research paper

Keywords*:* sustainability, sustainable development, perfect process, opportunity study, sustainability opportunity study, university sustainability.

1. Introduction to understanding sustainability

The Swedish government has at several occasions showed the ambition of being a leader within sustainable development. Sweden is often being highly ranked when assessed for sustainability performance. In the overall performance of all 193 UN Member States for achieving the UN Sustainable Development Goals Sweden is ranking nr 3. The RobecoSAM Country Sustainability ranking, which is a comprehensive framework for analysing countries' performance on a wide range of Environmental and Social Governance (ESG) metrics, ranks Sweden as nr 2 (RobecoSam, 2022). The Environmental Performance Index ranks Sweden globally as nr 8 out of 180 studied countries (EPI, 2022). The Swedish government has early identified education as a critical area for sustainable development in all education, exemplified by the law from 1992 and which was further elaborated in the university law of 2006 (UHA, 2022). Sweden could be seen as one of the global leaders in sustainable development.

Humanity is faced with existential threats, such as climate change, loss of biodiversity and extreme poverty, which need to be solved now. It might not be obvious who is responsible for solving the many sustainability problems, but logically and ethically it would be those who have the opportunities and the resources of doing it. Rich countries, such as Sweden, should take the lead as espoused by Swedish governments. In Sweden graduates often have a wide range of options and do not necessarily need to worry too much about securing a reasonable economy. The chances to work based on based on your convictions and with sustainable development are good. This could be interpreted as meaning that a sustainable Swedish university should do their best to support students to become change makers for sustainability.

Work with sustainable development requires specialists in many fields. Universities play a key role in providing research results to support sustainable development and in educating the people to lead sustainable development. Universities generally should support societies in their development. How universities in a country being a sustainability leader - like Sweden - have understood sustainability is therefore of great interest.

Understanding what we need to improve is a basic starting point for any improvement, whether quality or sustainability. This could in many fields be a challenge. Sustainability seems often to be interpreted as doing several improvement activities without clearly defining what sustainability or sustainable development are. Isaksson et al. (2022) demonstrate that in areas like building, health care, education and tourism it would be possible to propose sustainability and sustainable development goals based on an analysis of main stakeholder needs. When working with quality the focus on customers could be seen to include satisfying both wants and needs. The customer needs to be delighted to increase the level of customer retention and to secure economic sustainability. It is postulated that when working with sustainability the focus should be on vital stakeholder needs. Stakeholders are here broadly viewed as all individuals or entities that are affected or could be affected by the studied organisation.

The Triple Bottom Line of Profit, People and Planet could be used for a main categorisation of stakeholders. Profit stakeholders consist of companies and organisations producing and selling user value. People is represented by humanity and Planet is seen as nature. Isaksson et al. (2022) suggest that we could use the idea of the vital few based on the Pareto principle to identify the main stakeholder needs in the entire value chain, which the organisation is part of - from cradle to grave.

The Opportunity Study is based on Total Quality Management and suggests an approach for detecting improvement opportunities in any process (Isaksson, 2015). The starting point is defining the main performance indicators and goals for the studied process. The difference between the goal and the current performance is the improvement potential and is defined in the step of Diagnosing. This is followed by Analysing of causes and Solving with the result

being a proposed improvement project – an opportunity. Diagnosing relies on that the studied process has relevant performance indicators, targets and data. With sustainability there seems to be a problem with lack of agreed performance indicators. The Sustainability Opportunity Study (SOS) suggests how to Understand, Define and Measure Diagnosing of sustainability and thereby provides the indicators and targets needed for assessing the sustainability improvement potential, which then permits doing a full Opportunity Study (Isaksson et al. 2022).

The work with elaborating Diagnosing is in a preliminary stage and has only been described on a superficial level for education generally, see Table 1.

Table 1. Understanding, Defining and Measuring Diagnosing the value chain of providing education.

Value chain of	Understanding	Defining	Measuring (value/harm)	Summary improvement potential
Providing education	Main value is the right to learn and main harm the cost of learning	Inclusive quality education and lifelong learning opportunities for all	Realising educational potential and employability	The percentage and number of dropouts Percentage of those that cannot read and write

Source: Adapted from Isaksson et al. (2022).

Table 2. A proposed matrix for Understanding, Defining and Measuring Diagnosing.

	Understanding	Defining	Measuring
D	Scope, using value chain from cradle to grave by defining input, output and business idea of the studied business Identifying main sustainability stakeholders, their value needs, and the harms they are subjected to by in the value chain with focus on climate, biodiversity, and poverty as well as any other significant harm as identified with the four Sustainability Principles. Defining the qualitative improvement potential as the difference between possible and/or required performance and current performance	Based on the Pareto principle define the vital few stakeholders, value needs and harms caused Focus on People and Planet needs and convert this to a proposed definition that can be operationalised	Measure sustainability as a state and sustainable development as change Identify value and harm indicators – the KPIs (y-values) that can be used to describe current sustainability and the sustainability performance over time Value and harm are expressed in terms of impacts on People, Planet and Profit KPIs should be expressed in absolute and relative terms Assess the quantitative improvement potential for chosen y-values in terms of level and rate of change

Source: Isaksson et al. 2022

It should be possible to understand, define and measure sustainability in any process based on an outside in view in a process called Diagnosing. The starting point is in Understanding what sustainability is based on the main stakeholder needs in the value chain. An important part of this is studying the business idea or mission with the purpose of understanding if what is done is compatible with sustainable development, see Table 2.

The results presented by Isaksson et al. (2022) indicate that the outside in focus on main stakeholder needs for People and Planet can be used to establish definitions for sustainability and sustainable development including some key performance indicators. The use of Table 2 makes it possible to scrutinize any organisation or process based on output and outcome. For Swedish universities the work should start by understanding the university mission. This is traditionally described as three different parts consisting of: 1) Providing education based on science, 2) Doing research, 3) Cooperating with society. These three parts of the university mission can be seen as three processes. The main point is that understanding sustainability is described based on assessed stakeholder needs. The proposal from Table 2 is identifying main sustainability stakeholders, their value needs, and the harms they are subjected to by primarily focusing on climate change, loss of biodiversity, and poverty reduction. In addition, any other significant harm should be highlighted. The question that Swedish sustainability focused universities should be asking is: "How could we in the best way support sustainable development?" This is very close to Total Quality Management in focusing on customer needs.

The purpose is to explore how Diagnosing for a Sustainability Opportunity Study (SOS) could be understood for university services. Further, the purpose is to propose how the SOS could be used to assess the level of university sustainability.

2. Theory background

There is plenty of literature dealing with university sustainability and sustainable development. A search on Google Scholar for "University Sustainability" and "University Sustainable Development" results in 6490 respectively 763 hits. It is hard to find any agreed definition of sustainability and sustainable development for universities. Mostly, the expressions sustainability and sustainable development seem to be used interchangeably. The topic is highlighted by looking at university sustainability rankings and by studying some models for assessing university sustainability.

2.1 University sustainability ranking

When searching for sustainable university ranking we have not found any currently and generally used Swedish ranking system. The UI Green Metric World University Ranking shows the most environmentally friendly universities (UI, 2021). Five out of six criteria deal with the university campus. There is one criterion for education and research described with the text: “Is the university promoting and teaching sustainability? Are they contributing to the global effort through teaching and research?” Environmental focus is only one part of sustainability. With focus on main stakeholder impacts it would not be logical to have focus on campus management. Managing campus sustainability could be seen as must be sustainability – if missing then there is no credibility.

The Times Higher Education Impact Rankings assess universities against the United Nations’ Sustainable Development Goals (SDGs) (THE, 2022). The 17 SDGs have a focus on nations and many of the 169 targets might not be relevant for universities or other organisations. The SDGs provide a good checklist of global problems that need to be solved, but priorities vary depending on countries. University sustainability ranking does not seem to provide any clear understanding of what a sustainable university is. The rankings seem to be activity based

2.2 Assessing university sustainability

Richardson and Kachler (2017) write that: "The STARS system provides the best currently available data on sustainability performance by universities." The Association for the Advancement of Sustainability in Higher Education (AASHE) provides the Stars Manual for university self-reporting in sustainability (Star, 2019). Over 900 higher education institutions, businesses and non-profit organizations comprise AASHE's membership base. The manual does not have any clear definition for sustainability or sustainable development, but it provides the statement: "*Higher education has always recognized its public responsibility to educate students, to provide research that fuels our economy and strengthens our communities, and to model the behaviors that contribute to a just and more civil society. Recently, higher education institutions have also recognized the important role they can play in moving all of us to a more sustainable future, one that will provide prosperity today while ensuring that future generations have resources to meet their needs."*

Table 3. Summary of table of Credits in the Stars rating.

Category	Subcategory	Maximum score (when all criteria are included 209)
Academics (AC) - 58 (28%)		
	Curriculum	40
	Research	18
Engagement (EN) - 41 (20%)		
	Campus	21
	Public	20
Operations (OP) - 72 (34%)		
	Air & Climate	11
	Buildings	8
	Energy	10
	Food & Dining	8
	Grounds	4
	Purchasing	6
	Transportation	7
	Waste	10
	Water	8
Planning and Administration (PA) - 34 (16%)		
	Coordination & Planning	9
	Diversity & Affordability	10
	Investment & Finance	8
	Wellbeing & Work	7
Innovation & Leadership - 4 (2%)		
	Innovation & Leadership	4

Source: Own summary based on Star (2019)

The statement alludes to the commonly used definition for sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Interestingly the United Nations website UN (2022) defines sustainability using the same definition as for sustainable development with a reference to WCED (1987), which is not correct since the WCED text explicitly states sustainable development describing it as a change process. This is a good indication of how the expressions sustainability and sustainable development are used interchangeably. There seems to be no common understanding even on the basics. This makes it important to define the basic concepts for sake of clarity. We use the expression sustainability to describe a state of

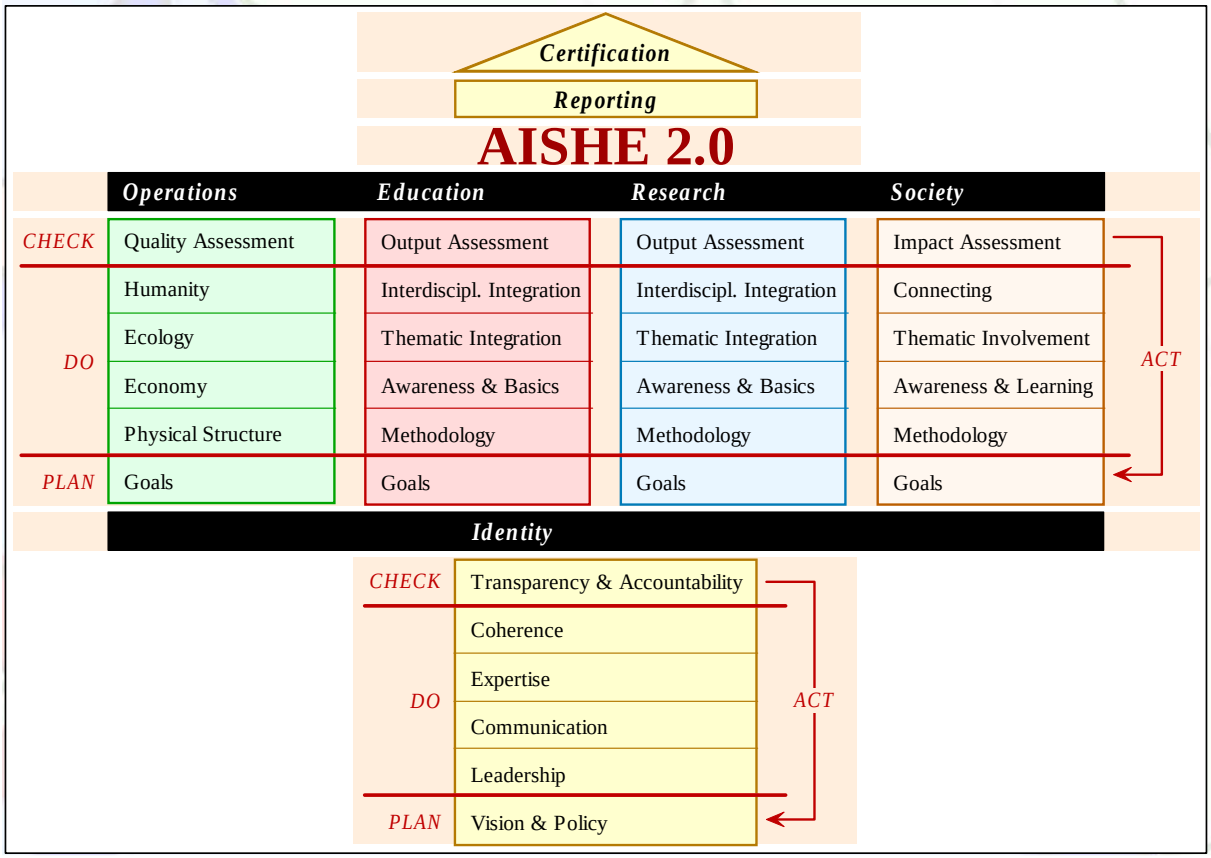
sustainability like we describe a state of quality and sustainable development as a change process that goes towards a stable state where the system can continue to exist without consuming the resources it is depending on (Isaksson et al. 2022).

The Stars manual proposes several areas to be evaluated and then indicates maximum scores for these areas. In Table 3 a presentation of the different areas with maximum scores. The Stars Manual does not motivate the choice of categories and could be seen as a typical example of the inside out approach where different activities are added up to a score. The maximum recognition level in the system is the platinum rating that requires a score 85% of the total maximum score. This can vary depending on the relevance of the different parts. There is no way to verify if there is a correlation between the recognition level and the outcome in the form of support to *"a just and more civil society" and " moving all of us to a more sustainable future"*. Most of criteria in Stars are about enablers for doing something. There is no clear logic to why different enablers and activities have been chosen as indicators of sustainability.

2.3 Using quality management based business excellence models

An important part of Quality Management is work with Business Excellence Models such as the EFQM (2022) that provides criteria both for enablers and results. Particularly with sustainability, where understanding of the "what" is more complicated than with quality, it is important to be clear on both enablers and results.

Figure 1. The AISHE 2.0 model for university sustainability.



Source: based on Roorda and Son (2016)

Roorda (2016) presents the Assessment Instrument for Sustainability in Higher Education (AISHE) based on the logic of Business Excellence Models and the mission of universities as

education, research, and societal cooperation. The model rates both enablers and results and seems to provide a good foundation for identifying core elements for a pilot review.

In Figure 1 the five modules of the model are presented. The first module is operations which has to do with the university premises. These often play an important role as they do in UI Green Metrics (UI, 2021) and the Stars model (see Table 3). How university campus is managed is important from a symbolic perspective. Credibility in teaching sustainability could suffer if there is no practical focus in managing the campus. But the main impact should be viewed in the university missions. The fifth module is called the Identity module and is important for understanding the leadership perspective. Without any clearly espoused sustainability goals from management there is no foundation for the system. The Identity Module is a crucial enabler. The Identity Module clearly relates to Understanding sustainability, where mission, value chain and main stakeholders are in focus. The Identity module could be used for a quick review of the level of university sustainability (Isaksson et al., 2013).

Table 4. Identity module, part of Vision & Policy with criteria presented in six stages. Shortened and modified from original AISHE 2.0.

	0 - Non existing or not demonstrated	1 - Activity oriented	2 - Process oriented	3 - Organization oriented	4 - Supply network oriented	5 - Society oriented
I-1. Vision & Policy	Policy not found using basic logic and within five clicks	The management has a vision on SD and CSR related to activities of the organization. There is an SD-policy. It could be integrated into an environmental policy. It is explained and relates to some common definitions such as Brundtland and The Triple Bottom Line (TBL).	There is a specific sustainability policy. It is backed up by strategy and plans and shows how staff is involved.	There are assessable goals that can be identified based on the TBL, which are presented in separate documents. The organization visions itself as a key player. Sustainability vision is found in mission statement.	The organization is recognized by its direct stakeholders as a key player for SD. This is backed up by credible external statements.	Within society at large, the organization is recognized as a leading key player for SD, acting proactively on a level of systemic change.

Source: based on Roorda and Son (2016) and Isaksson et al. (2013).

In Table 4 a maturity grid based on Vision & Policy criteria in the Identity module of AISHE 2.0 and adapted from Isaksson et al. (2013) is presented. The grid can be used to review existing policy documents and based on those make a first assessment of the level of sustainability. This is only a check of enablers. The results part needs to be checked in the output assessment of the modules of education, research and society, see Figure 1. The Education Module Output assessment is described as: *"The integration of sustainable development in the curriculum results in graduation theses in which sustainable development can be distinguished, thus proving that the program output is contributing evidently to sustainable development."* There

is a clear logic in this. Students that include sustainability in their theses are more likely to become active within sustainable development. Especially, since it is common that students are employed by the company where they have done their thesis work. The content of sustainability is in the AISHE2.0 model graded with a five-level scale. The Research Module Output assessment is described as: *"The integration of sustainable development in the research results in scientific reports and presentations in which sustainable development can be distinguished, thus proving that the research is contributing evidently to sustainable development."* The Society Module Output assessment is described as: *"The organizations and its societal partners investigate the impact of their interactions, not only on themselves but also on the rest of society and the natural environment."* The AISHE2.0 has a clear societal focus where the key stakeholders are the students and society. Society needs both competent human resources and research results that support societal sustainable development. This indicates that the sustainable university should work with stakeholder needs focus.

One way of simplifying a preliminary review is to focus on the main enablers and results. For the Identity Module the part of Vision & Policy could be seen to be the starting point where the espoused commitment to sustainability can be assessed. For results the output should be in focus verifying quantifiable results. This shows how the espoused policies have been enacted. Vision should relate to mission and to the criteria for understanding described in Table 2, such as value chain and identifying main sustainability impacts. There should also be definitions for sustainability and sustainable development in the vision/mission document. In Table 4 the vision & policy of the identity module is described based on (Isaksson et al. 2013). The AISHE 2.0 proposes five stages. This has been augmented with a zero level to describe universities that have not started work with sustainable development.

Based on Table 4 the highest stage for vision and policy is a university that is proactively working with systemic change towards societal sustainability. The AISHE2 model has a clear stakeholder needs focus and is based on a process view. This makes AISHE2 a good starting point for understanding university sustainability.

3. Methodology

The first purpose of how Diagnosing of Understanding-Defining-Measuring could be done for university sustainability is attained inductively based on directives from Table 2 for the three processes of education, research and co-operation with society. The value chains are described and in addition a Process Based System Model (PBSM) (Isaksson, 2019) is used to describe the university as a system with its main elements. The participating researchers have done the work including studies of publicly available documents describing Swedish university sustainability.

The second purpose of proposing a maturity matrix is attained by modifying Table 4 in connection with searching for relevant sustainability information in Swedish university web-sites.

4. Results

Results are presented with proposed processes for the three studied university missions, discussing their goals, followed by an interpretation using the PBSM (Isaksson, 2019), and an interpretation of Table 4 for the three processes.

4.1. University value chains with discussion of goals

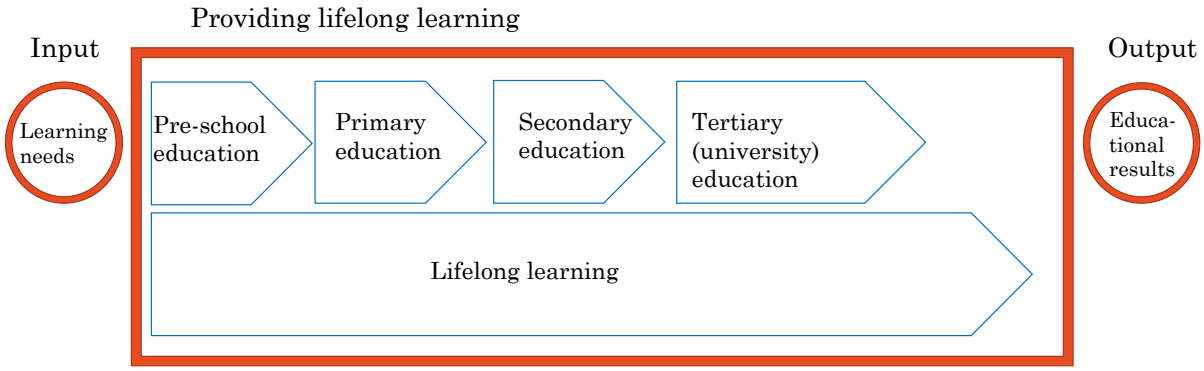
A value chain goes from cradle to grave which requires an interpretation. In Table 1 lifelong learning is described. Universities are part of this value chain which starts with the first

educational work in pre-school, and which ends when the learner is not engaging in any further learning activities.

It could be debated when lifelong learning starts. In Figure 2 lifelong learning is described as lifelong. Lifelong learning relating to universities could be support with introductory courses for those with minimum entry qualifications but also post degree support and providing complementary education when an entirely new degree is needed. Including teacher education would mean that there is a link to the very beginning with pre-school education.

Lifelong Learning (LLL) is a hot topic in Sweden since the University Law originating from 1992 has been changed in July 2021 to specifically introduce the university responsibility for LLL. Special funds have been allocated in Sweden and universities are currently struggling on understanding and defining what lifelong learning means. E.g., how should an ordinary free standing course with 50% of students being working adults be viewed? Is this lifelong learning? It seems that there will be different interpretations. In Figure 3 a further elaboration for University LLL is presented.

Figure 2. The value chain for lifelong learning



Source: Own visualisation.

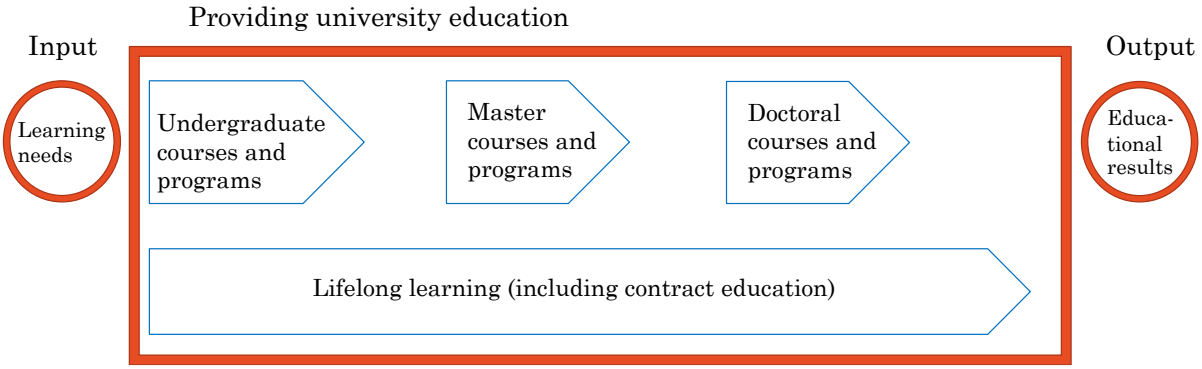
Focus should be on identifying stakeholder needs which could be seen to be both individual and organisational needs to increase competence. The process of lifelong learning should in a sustainable university focus on helping individuals and organisations with sustainable development. These processes are very close to the area of cooperation with society. The sustainability results of the educational process should be evaluated both in type, quantity and content. Type of education is education at different levels and the content would be assessed based on its focus on sustainability.

The AISHE2.0 document proposes for output of the Education module that: *"The integration of sustainable development in the curriculum results in graduation theses in which sustainable development can be distinguished, thus proving that the program output is contributing evidently to sustainable development."* At the highest "society level" it is noted that: *"In this analysis, representatives of society are involved actively"*. Here, further work would be needed, but it should not be too difficult to establish concrete measurements for the content of sustainability and sustainable development in different levels of theses output. A quick first review of Swedish universities indicates that this has not been done to any larger extent, but further research is needed.

The value chain for research should start from research needs, which looking at global needs should mean starting with the main global challenges with the university output being the amount of relevant research produced. The sustainability of the research value chain can only be understood by measuring the effects of the research. This goes beyond citations. The

relevance and effects could be assessed based on the outcome which would be checked with the main stakeholders who could be the research society with basic research and society with applied research. In the AISHE2.0 document it is stated for the output part in the research module: "*The integration of sustainable development in the research results in scientific reports and presentations in which sustainable development can be distinguished, thus proving that the research is contributing evidently to sustainable development*." To achieve the highest level, it is stated that: "*With its research, the organization demonstrably contributes to sustainable development on the level of systemic change. - Society is actively involved in a transdisciplinary way in the determination, evaluation and improvement of the sustainable elements in the research goals.*"

Figure 3. The value chain for providing university education.



Source: Own visualisation.

In summary universities should see that they focus on societal needs both with education and research. A leading university presenting itself as one working for sustainable development should ensure that it provides the sustainability competence and research needed. Uppsala University writes in its mission statement: *"The mission of Uppsala University is to gain and disseminate knowledge for the benefit of humankind and for a better world. … Our University will put all its breadth and combined strength into supporting sustainable development, engaging with the wider community and promoting openness and respect."* (UU, 2019). Based on Table 4 the documentation provided would merit UU the level of 1 – Activity Oriented. On the side of output there is nothing explicit and the preliminary assessment there would be level 0. However, in 2022 the vice chancellor has started a project called Sustainable Future which involves the entire university. This will probably lead to some changes.

Future work in assessing the current level could be done for the educational process by specifying output indicators referring to sustainability content in courses and programs and in course projects and theses. This could be done as a pilot study for a chosen department with the dual purposes of testing the assessment model and receiving a first assessment. Preliminary plans for this exist for the Department of Civil and Industrial Engineering and its three Divisions. This would not be a representative sample, but sufficient for testing an assessment model and for providing a first indication for the department.

Since understanding sustainability is a key issue, previous, current and planned research projects could be studied to assess how sustainability and sustainable development have been interpreted. Uppsala University does not clearly specify what is meant with sustainable development and we have not been able to find any further definition on the University website. The closest to a definition we have found is from the policy document UU(2019) stating: *"The concept of sustainable development is understood in a broad sense and the goals are*

challenging." This means that researchers in different projects would have to use their own understanding when describing sustainability and sustainable development. The study of how sustainability and sustainable development have been interpreted in research projects could also provide a better system understanding which could improve research applications.

4.2. The university as a value producing system described using the PBSM

The PBSM has in Figure 4 been used to interpret the Swedish process of providing university services with the three identified main processes. The level of focus on sustainability is partly defined in what the Swedish University Law requires and then in the university Mission declarations. In Figure 4 there the 10M checklist for resources is used. The Mission resource includes the core value creation idea that the organisation has espoused to work with. This could on the practical assessment level be interpreted based on publicly available mission statements. The task of managing a good and sustainable campus is described as a support process, one that has internal customers.

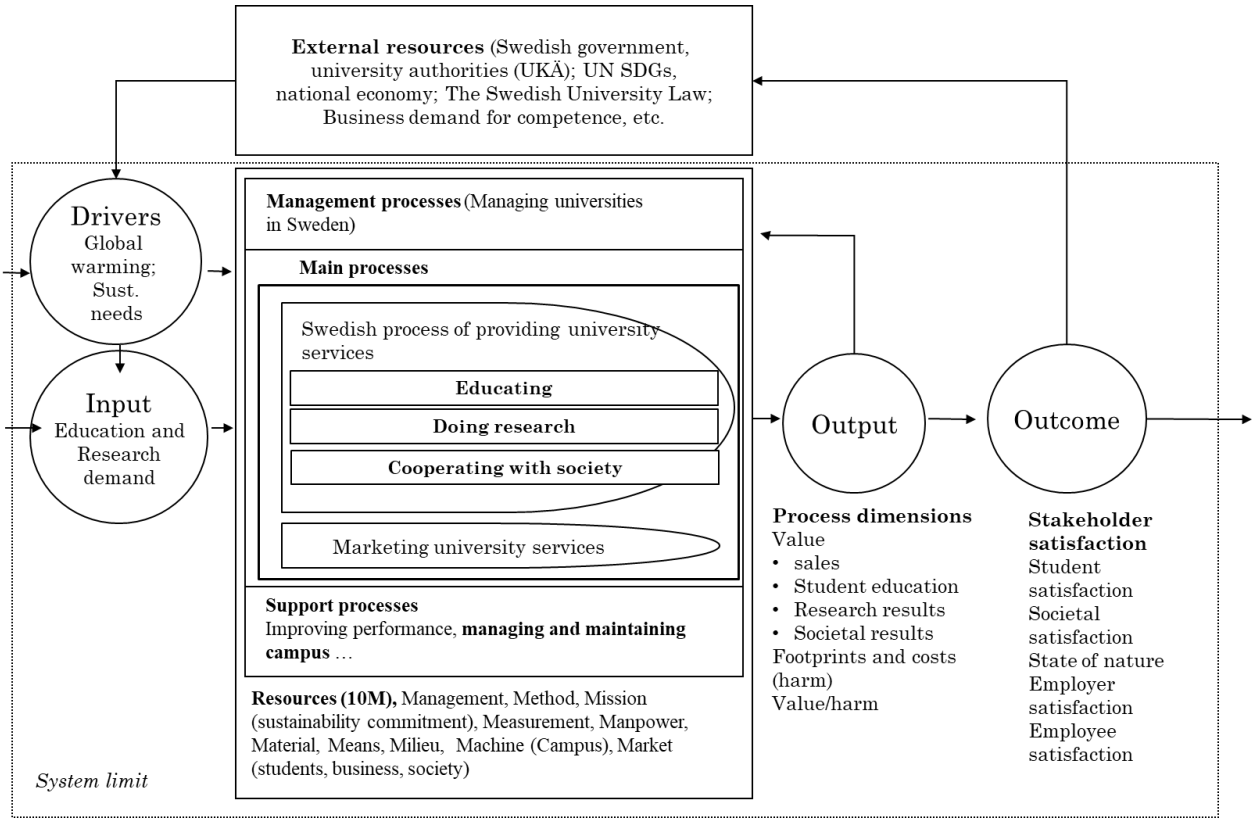


Figure 4. The system of providing Swedish University services described using the PBSM

Source: Own visualisation.

Improving performance, which would include sustainable development as a change process, is described as a support process. This is where the new UU project of "Sustainable Future" would be located. A simplified sustainability assessment, which reviews the level of sustainability by studying espoused and enacted policies can be related to the Mission resource and to Output. Proposed indicators for output are both absolute and relative. The relative ones are based on the value/harm concept (Isaksson et al. 2015). A practical assessment requires further specifying of especially the output in value creation for students, research society and the entire society.

4.3. Interpreting Understanding-Defining-Measuring of Diagnosing University Sustainability

With a starting point in Table 2 and the input from the review of the AISHE2 model, Table 5 has been proposed as a first step in assessing university sustainability. The Understanding of Diagnosing starts with agreeing upon the university mission. The sustainable university focuses on supporting society with sustainable development. This is done in three main processes of education based on research, research and cooperation with society.

Table 5. A proposed matrix for Understanding, Defining and Measuring Diagnosing for Sustainable University Services, based on Isaksson et al. (2022). Additions in bold.

	Understanding	Defining	Measuring
D	**Mission** supporting society in: - education based on research (**value chain** of lifelong learning – see Figure 2) - research (**value chain** from needs to outcome of research) - cooperation with society (**value chain** from needs to outcome of cooperation) - **Managing a sustainable campus** (must be sustainability) **Main stakeholders and needs** - **students** becoming actors working for sustainable development - **research society** being supported in basic and applied research with relevant knowledge (priority for climate change, loss of biodiversity, reducing poverty) Defining the qualitative improvement potential based on best theoretical output for university missions compared to current performance Creating a first system interpretation using the **PBSM**	University sustainability is defined as maximising competence creation and outcomes for sustainable development with focus on main global sustainability impacts using all available resources Sustainable development is defined in relation to the change process from the current level of sustainability to the define level of sustainability. Above a certain level of improvement the change process can be defined as sustainable development.	Measure **sustainability as a state** of working with sustainability in education, research and co-operation with society and **sustainable development** as change of this **Value for actors** and common know how (research society and practitioners) **Harm as time and money** spent KPIs (y-values) are used to describe current level of university sustainability and the sustainability performance over time (level of improvement) KPIs should be expressed in absolute and relative terms Targets for sustainability and sustainable development to be set based on an analysis of People, Planet and Profit needs Assess the quantitative improvement potential for chosen y-values in terms of level and rate of change

Source: Own elaboration.

The proposed Understanding-Defining-Measuring of Diagnosing University Sustainability in Table 5 is a work in progress. There have been some substantial changes from Table 2 which

is generic whereas Table 5 describes specifically University sustainability. The relevance of the specification in Table 5 will be tested iteratively in future research. One change is that the PBSM has been introduced in the part of Understanding. The purpose is to create a common view of the system. The PBSM in the generic Opportunity Study – Diagnosing-Analysing-Solving (Isaksson, 2015) plays an important role in the part of Analysing. There are several uses of the PBSM.

5. Discussions and conclusions

The study has several limitations and should be seen as a work in progress where we test the idea of stakeholder needs focus as sustainability in the university context. The review of existing models and measurements is limited, but our work still highlights the lack of agreement on what sustainability and sustainable development are. In addition, the indication is that focus in university sustainability often is on activities and that there is a lack of clear definitions of how sustainability and sustainable development are understood.

Understanding sustainability in higher education has been discussed from a theoretical point of view using mainly the AISHE2 model which is based on the logic of Business Excellence Models. The model was presented around 2010 with the development work mainly been done by Niko Roorda. We have not found any references to the model after 2016, which indicates that it is not widely used. Generally, the interest in Business Excellence Models has gradually been reduced in Sweden since a peak from around 1995-2000. But these models are still used and are based on a solid logic for understanding what is meant by customer focused quality. This same logic should also be valid for sustainability.

The Sustainability Opportunity Study (Isaksson et al. 2022), which is used as a starting point is a work in progress. However, it has survived a few iterations and can be logically motivated based on a stakeholder needs focus.

We conclude that Diagnosing University Sustainability can be understood based on the three University Missions of educating, researching and cooperating with society. In addition, campus should be managed in a sustainable manner to maintain credibility. However, university sustainability is mainly assessed based on the extent the university contributes to societal sustainable development. This is a function of the student sustainability competence, the research sustainability knowledge impacts in basic and applied research and the effects achieved in co-operation with private and public organisations.

The three university missions have been interpreted as processes and compared with the value chain for each process. University Education should relate to the entire process of Lifelong Learning as described in Figure 2, basically covering human lifespan. A particular focus is on the ordinary university courses see Figure 3. Further work is needed to agree upon what lifelong learning is. Here the educational process and the process of cooperating with society seem to merge.

The value chain for research is proposed to start with research needs. This would be how the start of the current university research process is viewed. However, the value chain output is when research is put into use. This is going further than what would be the case in current research where the output is presented as publications and occasionally as citations of publications.

The value chain for societal cooperation would go from needs to needs satisfaction, which means that sustainability outcomes should be included.

How the missions can be seen as part of the system have been described in the PBSM interpretation seen in Figure 4. The system description can be used to create a common understanding and to help in defining and measuring sustainability. Figure 4 includes some

proposed indicators for output and outcome. Outcome is here defined as the level of stakeholder satisfaction whereas output is what the process delivers like number of graduate students, number of research articles etc.

The proposed matrix for understanding, defining and measuring university sustainability in Table 5 could be used as a starting point for assessing the level of university sustainability and sustainable development.

Further research is planned applying Table 5 on a selection of educational programs and research projects, which should be easier to do than assessing cooperation with society.

References

EFQM (2022). The EFQM Model: An Overview, accessed 5 August 2022, available at https://mcusercontent.com/8aae4cc18759a21fc7689d67a/files/cf22fdb2-6b56-c90a-0aab-92a0e4995b09/EFQM_MODELBROCHURE_2021_Summary_EN.pdf

EPI (2022). Environmental Performance Index, https://worldpopulationreview.com/country-rankings/most-environmentally-friendly-countries

Isaksson, R. (2015). "Making sense of opportunities in building material production". *The TQM Journal*.

Isaksson, R. (2019). "Creating a sense of urgency for sustainable development–Testing two system models", *Journal of Cleaner Production,* 227, 1173-1184.

Isaksson, R., Johnson, M.W., Garvare, R. (2013). "Towards a model for measuring university sustainability". *In Proceedings of the International Conference on Intellectual Capital, Knowledge Management & Organizational Learning*, 213-221.

Isaksson, R.B., Garvare, R. and Johnson, M. (2015). "The crippled bottom line–measuring and managing sustainability". *International Journal of Productivity and Performance Management*.

Isaksson R., Ramanathan S., Rosvall M. (2022). "The Sustainability Opportunity Study (SOS) - Diagnosing by Operationalising and Sensemaking of Sustainability Using Total Quality Management", *accepted for publication in TQM Journal.*

RobecoSAM (2022). Country Sustainability, *Accessed 22-08-05* Rankinghttps://www.robeco.com/en/key-strengths/sustainable-investing/country-ranking/

Roorda, N., Son, H.V. (2016). "Education for sustainable development", *In Sustainability Science* (pp. 335-347). Springer, Dordrecht.

SDG ranking (2022). Rankings - The overall performance of all 193 UN Member States *Accessed 22-08-05 https://dashboards.sdgindex.org/rankings*

Stars (2019). Stars technical manual, accessed 5 August, 2022, available at: https://stars.aashe.org/wp-content/uploads/2019/07/STARS-2.2-Technical-Manual.pdf

Richardson, A.J., Kachler, M.D. (2017). "University sustainability reporting: a review of the literature and development of a model", *In Handbook of sustainability in management education, In Search of a Multidisciplinary, Innovative and Integrated Approach Research Handbooks in Business and Management series*, 385-405. Elgar Online.

THE (2022). Times Higher Education Impact Rankings 2022, available at https://www.timeshighereducation.com/impactrankings#!/page/0/length/-1/sort_by/rank/sort_order/asc/cols/undefined accessed 11 August 2022.

UHA (2022). "The Swedish Higher Education Act (1992:1434)", available at https://www.uhr.se/en/start/laws-and-regulations/Laws-and-regulations/The-Swedish-Higher-Education-Act/#chapter5, accessed 11 August 2022

UI (2021). UI Green Metrics Overall Ranking 20201, available at: https://greenmetric.ui.ac.id/rankings/overall-rankings-2021 accessed 11 August 2022.

UN (2022). United Nations, Academic Impact, available at https://www.un.org/en/academic-impact/sustainability accessed 5 August 2022.

UU (2019). Uppsala University's mission, goals and strategies, available at 4) https://www.uu.se/en/about-uu/mission-goals-strategies/mission-goals-strategies/#anchor-273256 accessed 11 August 2022.

WCED (1987:43). WCED (World Commission on Environment and Development) (1987), "Report of the World Commission on Environment and Development: Our Common Future", Oxford University Press, Oxford.