Part II

// Unlocking Sustainable Development's Potential

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The SDS4HEI Framework is an integrated model that aims to guide you in your organisation's transformative journey towards sustainable development. It is composed of three interrelated frames mutually reinforcing each other.

The organisational frame adopts an internal perspective, inviting you to explore your Higher Education Institution (HEI) through the dynamic lens of sustainability development (SD). A shared vision, anchoring SD in your organisation's core functions, encompassing education, research, outreach, entrepreneurial activities, on-campus operations, and governance is a vital element.

Closely intertwined, the capacity frame outlines six key capabilities related to governing, measuring progress, promoting equity, adaptability, transformative and transfer capacity, which are essential for implementing sustainability initiatives effectively.

Next to internal aspects, external contextual factors that influence your actions are important. Hence, the contextual frame delves into the broader environment in which your HEI operates. It examines societal and cultural factors, institutional aspects, economic considerations, and political influences that play a role in the pursuit of sustainability.

Utilising this framework can assist you in strategically enhancing your organisation's commitment to sustainable practices, adapting to changing circumstances, and positively contributing to SDGs.

1   What the SDS4HEI Framework is about

For HEIs envisioning a whole-institution approach, sustainability must become a guiding principle in all fields of action.

The SDS4HEI framework model provides a generalised supporting structure for HEIs to **find and implement strategic paths for SD.** It allows for a more straightforward presentation of interrelations and connectivity, shows progress in impact areas, identifies gaps and relevant stakeholders, and facilitates the implementation of (new) measures. While strategic plans, vision and mission are subjective to a particular HEI, the framework, as a guiding instrument, is abstract enough to **ensure transferability.** It is also **interactive,** with tools and building blocks so HEIs can develop specific implementation strategies while engaging with the framework. The model consists of three different frames – (1) the organisational frame, (2) the capacity frame and (3) the contextual frame (see **Figure 1**). Each frame contains elements, referred to as measures, variables and factors, further defining it and interacting with one another, enabling the creation of meaningful relationships across the different frames.

The **organisational frame** (–» **2**) takes an inside perspective and comprises elements such as your vision, organisational culture and structure, your core functions (–» **2.3**) and governance. The **capacity frame** (–» **3**) emphasises the capabilities allowing you to successfully implement SD in your HEI. From an outside perspective, the contextual frame focuses on the framework conditions, including the societal/cultural, institutional, political and economic frames, in the region where your HEI is embedded (–» **4**).

What makes the SDS4HEI framework special is that it takes the different types of HEIs and their respective structure into account and their regional context. While the organisational structure determines the power relations that influence SD, the organisational culture is the basis for actors' (de)motivation to engage in certain activities. Dividing the **SDGs** into their **specific targets** makes SD more feasible and measurable.

The framework model allows you to connect your organisation's vision of a sustainable future, expressed in the particular targets you choose to reach, with concrete steps and the regional context, acknowledging HEIs' responsibility for regional and social development.
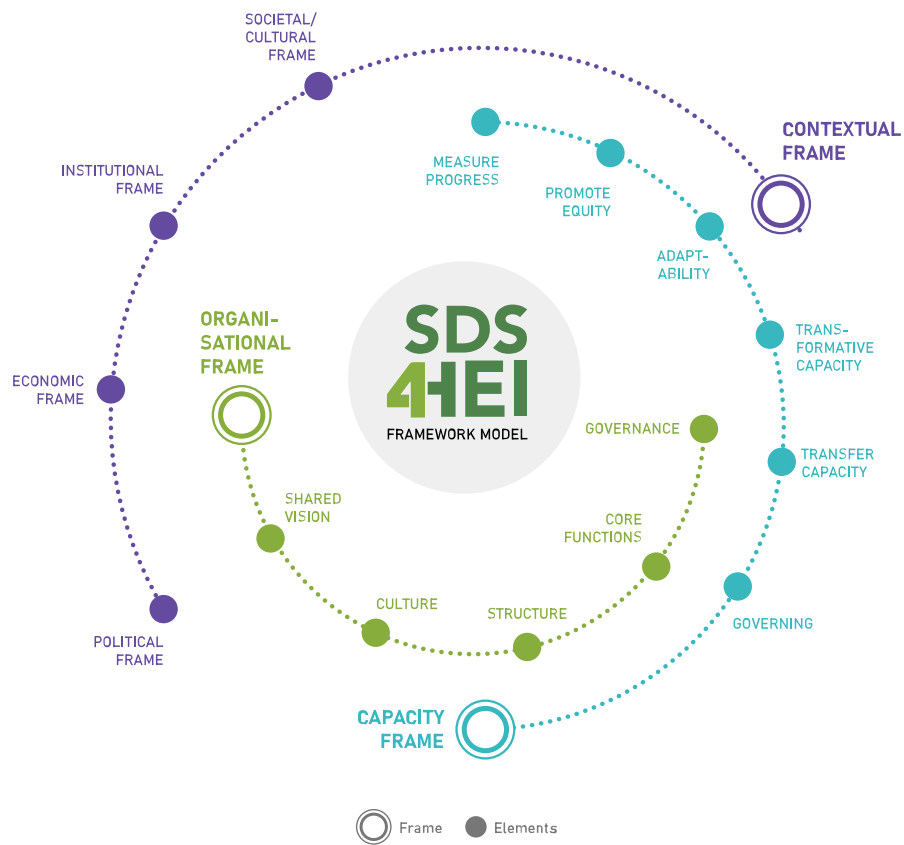
Figure 1.
SDS4HEI
Framework Model

2   Organisational Frame

Following the whole-institution approach, the innermost frame of the SDS4HEI model, the 'Organisational Frame', looks at the constituent parts of HEIs. The frame concentrates on HEIs' structures, including the type of HEI, its governance structures, core functions and the culture shared by its various stakeholders (academic and non-academic staff, students and leadership).

2.1   United Under a Shared Vision

Following an 'all dimensions' approach, the transversal cultural dimension determines how SD is understood in a specific context and influences the motivation to take action.

'Culture' and 'Structure' are interconnected and are the main pillars enabling long-term behavioural change. Diverse backgrounds, including community, culture, academic discipline, and a wide range of interests, values and beliefs, characterise internal and external stakeholders of HEIs. HEIs must collectively embrace a shared understanding and unified sustainability vision to implement SD successfully. They must clarify 'for whom' and 'why' SD should be pursued before taking concrete actions. A clear and specific idea is essential before setting goals (Findler et al., 2019).

While culture encompasses the unwritten rules, rituals, stories, shared beliefs and values within HEIs, the **organisational structure gives culture its concrete, legal form and ascribes power to people and institutions.** Governance structures determine power relations, who can participate in what kind of processes, and whose interests are represented. They distribute rights, responsibilities, authority and accountability among different stakeholders. It further defines decision-making rules and proce-

dures. Interwoven with all the other frames and their elements, 'governance' has an overarching function and must be viewed as a particular element within the organisational frame.

The respective type of HEI and its structure determine the configuration of its core functions: (1) to provide new knowledge through research, (2) to impart knowledge and skills to students through education, (3) to organise operations and life on-campus, and (4) to enable the diffusion of knowledge and innovation into society and economy. Structure and culture influence each other and shape the relationships between a HEI's social actors.

HEIs have evolved, gradually taking on more social responsibility and opening towards new stakeholders and co-creation processes. Research indicates four different historical phases, beginning with the traditional HEI, then a modern, a postmodern and finally an **integrative HEI** (Giesenbauer & Müller-Christ, 2020; DG HochN, 2021). The evolution is characterised by a transformation from 'an educational establishment' to a focus on the knowledge-creating (research) function, and in recent years shifted towards active engagement through the so-called **'Third Mission'** (Giesenbauer & Müller-Christ, 2020).

The organisational frame — the culture and structure of a HEI — is shaped by the **contextual frame.** Different countries possess different institutional forms, regional conditions and binding laws. While some HEIs might decide to emphasise research efforts to develop solutions for regional SD-related challenges, some HEIs might stress their social responsibility through third-party mission activities. Regardless of the route taken, HEIs should strive to build upon pre-existing conditions, including strategic plans and regional and cultural contexts, and strengthen knowledge transfer.

2.2 Manifestations of Culture & Structure

'Culture' can be articulated in a HEI's vision and mission statements. A **'Vision' (why)** is a public statement describing an organisation's high-level goals for the future — what they hope to achieve and what they want to become if they successfully fulfil their organisational purpose or mission. A vision is aspirational and gives the organisation's efforts direction. These visions serve as guiding principles and long-term objectives that drive institutional policies, practices, and initiatives.

> A HEI's vision for SD can play a transformative role in shaping the institution's culture, operations and impacts.

Ideally, a HEI's vision inspires and guides stakeholders, drives innovation and research, and promotes interdisciplinary education and research. Hence, it contributes to a more sustainable and resilient future.

A **'Mission' (what)** is a public statement describing the organisation's founding purpose, practical commitments and actions that an organisation believes are needed to achieve its vision — i.e. what it does and why it does it. It focuses on today and what an organisation does to achieve it. **HEIs' missions are vital in shaping their purpose, identity, and dedication to sustainability.** While the vision establishes long-term direction, the mission statement succinctly expresses the institution's core values, principles, and actions pertaining to SD. The interplay of institutional elements such as vision, mission, value statements, and governance structures of the institutional framework creates an environment conducive or not to the systematic integration of SD in HEIs (Gupta & Singhal, 2017).

'Value Statements' (how) describe the morals and values of an organisation and guide its actions. They illustrate how a HEI envisages achieving SD, how it plans to interact with the community and which aspects of sustainability will be prioritised.

HEIs benefit from finding points of connection between their already existing strategic plans, vision, mission, and value statements and their ideas for SD. **Strategic planning** in the context of SD involves identifying key priorities, assessing current and future challenges, and formulating strategies and initiatives that promote sustainable practices and outcomes. It typically includes conducting comprehensive assessments of environmental impacts, social factors, and economic viability to inform decision-making. The process should also actively involve internal stakeholders and ensure their participation and collaboration while shaping the strategic plans of the HEI. External stakeholders, such as community representatives, businesses, politicians, and non-governmental organisations, can also be included in later stages.

2.3 Overview of the Core Functions

HEIs core functions or missions comprise education, research, outreach & partnering start-up activities, campus operations and governance.

2.3.1 Education — Learning for a Sustainable Future

'Education' is one of the core functions of HEIs. SDG 4 (Quality Education) is the cornerstone for achieving a long-term, global transformation. Education for SD raises sustainability awareness and **equips learners with the knowledge, skills and values**

necessary to become responsible and active citizens and make informed decisions (Kioupi & Voulvoulis, 2019; UNESCO, 2023). In recent years, there has been an increase in sustainability-related courses, programmes and extracurricular learning activities in tertiary education across Europe.

'Education' relates to the other elements of the frame through, for example, different forms and modes of teaching. Students may gain practical knowledge through trans-disciplinary collaborations with regional businesses. 'On-campus operations' can be viewed as a place for 'research' and 'education', allowing for (informal) learning. Students may experiment in project-based learning activities, working on new sustainable ideas and practices in a campus setting. The practices and values incorporated by campus design and operations also function as a 'Hidden Curriculum', conveying a certain 'sustainable mindset'.

By teaching students how to implement the SDGs in their future careers and wider lives, they will be equipped with the means to approach and **solve the most prevalent problems** of our time. Connecting the pedagogical content to the SDGs benefits the labour market and creates new professions. By combining entrepreneurial education and sustainable skills, education must ensure **employability related** to 'Entrepreneurial Activities' and 'Outreach & Partnering'. Combining entrepreneurial and sustainability skills will likely impact values, beliefs and orientations that guide future entrepreneurial actions (e.g. the desire to generate economic, social and environmental value). Entrepreneurial education is often lacking the **two-way integration approach.** Firstly, teaching students the Green Deal will influence their future entrepreneurial activities, even in the IT sector and remote working culture. Secondly, it will encourage young students to start businesses in the green economy or related sectors.

> Sustainability-oriented entrepreneurs are driven by the desire to create economic, social, and environmental value through their business activities.

In addition to students, SDS4HEI will provide other stakeholders with the essential knowledge required for introspection regarding their values and practices, enabling them to identify opportunities for adopting more sustainable behaviours. Through training and knowledge exchange, stakeholders can learn about the SDGs and their role in championing them at their HEI and beyond. It would also motivate educators and HEI management staff to engage in SD and influence the institution's governance over time. Citizen science promises to educate the wider public and initiate a **reflection process** on behaviour and values within a region.

Different 'Measures' help promote SD in education, including teaching new skills, curriculum development, training activities, practical experiments, on-campus learning, extracurricular activities, and certificates.

Measures in Education

- Curriculum development
- Combining entrepreneurial and sustainable skills
- Extracurricular activities
- Project-based on-campus learning
- Transdisciplinary collaborations with regional stakeholders (e.g., companies, regional development agencies, organised civil society)
- New (digital) teaching and learning methods (e.g., citizen science)
- Establishing incentives such as awards and certificates

MEASURES

2.3.2 Research — Driver of Innovation & Change

'Research' is the core function that gives HEIs innovative and transformative power. By gathering data, processing information and analysing findings, HEIs create new knowledge, find solutions and identify possible actions. Following Clark & Harley (2020), novelty and innovation are understood as central to HEIs and **effective SD strategies must be based on (sustainability) science.** The organisational structure and culture need to be open and provide niches and **safe spaces for experimentation.** User practices and regulatory structures must not interfere with novelty and innovation. It is essential to research not only on but also following SD. Such an approach includes recognising relationships between society and nature, problem-driven or goal-oriented research, looking at horizontal and vertical connections and having a consumption-production perspective (ibid.).

The European Union promotes **'Responsible Research and Innovation',** which emphasises the evaluation of effects and potential impacts on the environment and society—a criterion for which researchers are encouraged to account. More so, researchers can actively contribute to SD by finding alternatives and solutions that address various challenges. This assumption is based on a 'weak understanding' of sustainability, in which global challenges can be met with human-made solutions and resources can be substituted by artificial products.

Collaboration accelerates the pace of transformative change. 'Research' can benefit from new sources of knowledge by collaborating with new actors, such as citizens and practitioners, which relates to the element of 'Outreach & Partnering'. Stakeholders

who actively participate in knowledge creation, innovation, and decision-making processes tend to be more inclined to assume responsibility for addressing problems (i.e., problem ownership), adapt their behaviour, and exhibit receptivity to transformative changes.

Research is also the basis of 'education' through constantly producing and integrating scientific findings into existing curricula. Students are trained to become researchers themselves, for example, through 'inquiry learning'. Concerning 'Entrepreneurial Activities', scientific results are turned into practical business ideas, and new sustainable solutions and practices may become part of campus design and operations.

Measures to promote SD in research include, for example, new modes of research, including transdisciplinary and participatory research. By tapping into a wide range of knowledge sources, we can adequately address the intricate nature of sustainability challenges and work towards creating practical solutions. Collaborations with regional actors such as businesses, policymakers, and (organised) civil society work in favour of regional development towards more sustainability.

Measures in Research

MEASURES

- Employing Responsible Research and Innovation (RRI)
- Experimenting with and adopting new modes of research, including transdisciplinary collaborations, participatory (action) research, and citizen science.
- Research on and with SD to elaborate practical solutions.
- Introducing incentive systems, such as research challenges on sustainability, awards

Table 2.
Possible Measures
in Research

2.3.3 Outreach & Partnering – Following the Third Mission

Knowledge transfer to society takes place through various formats and channels such as spin-offs, cooperation with companies, living labs, position papers, exhibitions, lectures.

As powerful institutions connected to research and education, HEIs are responsible for raising awareness for sustainability beyond their institutional boundaries through, for example, community engagement, outreach and partnering.

Since the beginning of the 21st century, HEIs have begun to take on more social responsibility by formulating a **'Third Mission'.** Third missions refer to HEIs' broader roles and responsibilities supplementary to their traditional teaching functions (first mission) and research (second mission). It encompasses the idea that HEIs have a social responsibility to **contribute to society in various ways besides their core activities.** Accordingly, Compagnucci and Spigarelli (2020) posit the third mission as a multidisciplinary, complex, evolving phenomenon linked to the social and economic mission of HEIs broadly.

The concept of 'third mission' comprises a wide array of activities undertaken by HEIs. These activities aim to **share knowledge with society and organisations while fostering entrepreneurial skills, promoting innovation, advancing social welfare, and cultivating human capital.** Moreover, a third mission involves the collaboration between science and society through various forms of communication and engagement with community/quadruple helix actors (Carayannis et al., 2018), i.e., academia, governments, business and civil society (Di Berardino & Corsi, 2018). Engaging with society also marks the third missions' transdisciplinary nature. Our futures are inextricably linked to our ability to achieve climate neutrality and SD. Transnational collaboration is desirable and indispensable, as it can provide substantial added value by facilitating the exchange of knowledge, including new perspectives and practices. The European Green Deal states clearly that all citizens will need the skills and motivation to understand and act on issues of SD. Therefore, HEIs should offer ways of civic engagement in their wider community, creating synergies and new opportunities, considering SD is a lifelong learning process (UNESCO, 2023).

Through (international) partnerships, HEIs can target SD in their institution and region whilst also contributing to finding solutions on a global scale. Participating in networks, alliances, and partnerships is vital for **sharing good practices and knowledge** and upholding stakeholders' motivation. This need for strong, international partnerships is also expressed in SDG 17 (Partnership for the Goals).

> In the realm of SD, HEIs have a vital role to play in comprehending and interpreting social needs, behaviours and habits, essential for the purposive co-creation of sustainable and just futures, which is also referred to as collaboration for the common good (Wright et al., 2022).

Based on the statement above, HEIs dedicated to fulfilling their third mission are responsible for partnering with quadruple helix actors. This entails nurturing a collaborative culture and establishing a recognition system that encourages and acknowledges these cooperative efforts within the HEI. In addition to transferring knowledge,

HEIs can proactively convey their commitment to SD, serving as a positive **role model** within their regions.

While SD means to act and progress in the best interest of people and the planet, HEIs will also become more resilient to future shocks and build a reputation for actively promoting SD in their region. SD is thus necessary for HEIs to **remain relevant, valuable and suited** to creating the smart, engaged and responsible citizens that world-class higher education is meant to produce. Measures to promote SD in outreach and partnerships include the following examples:

MEASURES

Measures in Outreach & Partnering

- Fostering a collaborative culture with quadruple helix actors and active engagement of external stakeholders increases motivation.
- Implementing a system of recognition and incentives for collaborations
- Introducing new formats and communication channels such as living labs, exhibitions, position papers and lectures
- Reporting on SD activities through science communication to facilitate visibility, reputation building and the establishment of a culture of sustainability within a region.

Table 3.
Possible Measures in Outreach & Partnering

2.3.4 Entrepreneurial Activities – From Theory to Praxis

Students, graduates and academic staff are encouraged and assisted to apply their entrepreneurial skills, sustainblility-related business ideas, and innovation rooted in scientific principles.

HEIs are increasingly responsible for promoting the transfer of innovation (technological, social, cultural) into practice. 'Entrepreneurial Activities' are therefore part of the outreach mission of HEIs. Hence, motivating and supporting students, graduates, and academic staff in their entrepreneurial endeavours is crucial. Start-ups are especially promising for the transformation of the economy because of their **innovative capacity, agility and promptness.** They build bridges between scientific findings and their practical implementation in the region and society. By teaching new entrepreneurial skills

through 'Education', HEIs assist the transformation of the economy and develop a new kind of entrepreneur who is socially responsible and makes informed decisions.

Accordingly, HEI should link their entrepreneurial education to sustainable competencies and 'green attitudes' across all sectors. Those interested in founding a company must be encouraged to take the chance and go for a green business in one of the sustainable sectors. **Governance structures must be open for different social, technological or cultural innovations.** In connection with the third mission, HEIs need to emphasise sustainable regional development in terms of human resources, ecology, economy, and mindsets. As influential regional actors, HEIs can contribute to initiating and orchestrating regional business, innovation and entrepreneurial/start-up ecosystems driven by potential, fostering a more sustainable future.

Measures regarding SD in 'Entrepreneurial Activities' are best integrated by aligning start-up strategies and support services with sustainability. The SDGs can be a helpful guide to thinking about the connection of business ideas to sustainability-related challenges.

MEASURES

Measures in Entrepreneurial Activities

- Entrepreneurial support programmes with a focus on SD
- Entrepreneurial consulting oriented towards SD
- Raising awareness through training and workshops
- Non-university partnerships (e.g., Impact Hubs)
- Awards, competitions for solutions for societal challenges
- Recognizing the potential for promoting a regional ecosystem

Table 4.
Possible Measures in Entrepreneurial Activities

2.3.5 Campus Operations – Experimentation & Learning by Doing

HEIs should become stewards of sustainable organisation management and operation.

The integration of the SDGs in campus design and operations is not only useful for conveying the 'hidden curriculum', but it also aligns with the EU's New European Bauhaus initiative, acknowledging the importance of **enriching, sustainable and inclusive places for practices and experiences** (European Union, 2023).

The **'hidden curriculum'** describes values and practices incorporated by the campus design that internal stakeholders adopt through informal learning. Therefore, HEIs should use their campus as a practical and inspiring example from which stakeholders can learn and adopt practices. The campus should invite stakeholders to experiment and **offer opportunity spaces for new forms of value co-creation** (Hinkel et al., 2020). Sustainable campus experiences could enable the discussion on global societal challenges, foster ecological literacy, and eventually lead to changed values and behaviours. Everett (2008: 243) proposes that internal stakeholders must develop an understanding of the "university's metabolism". This could be achieved through 'campus sustainability praxis' or as posited by Everett (ibid):

> " […] a campus-centered form of community-based service learning in which the community that students serve is their own college or university as well as the local community in which it is situated, and the experiential learning focuses on concrete institutional change.

In such settings, students create a vision, set specific goals, develop a strategy, and work on recommendations for campus officials by collaborating with an interdisciplinary group (ibid.). They learn that **institutional change work is primarily routine** and learn how power is distributed within an institution.

The 'Campus Operations' measures range from resource management, mobility, and greenhouse gas emissions to food systems, land and water use, and questions of the regional ecosystem and finances to inclusivity and accessibility.

MEASURES

Measures in Campus Operations

- Sustainable campus design such as green buildings, food/book donation and recycling stations, accessibility for all
- Resource management (e.g., greenhouse gas emissions, re-/upcycling, water usage, vegetarian food in the cafeteria)
- Energy consumption and renewable energy
- Waste management (e.g., composting)
- Alternative modes of transport

Table 5.

Possible Measures in Campus Operations

- Learning and awareness-raising activities (e.g., community garden, experiments)
- Implementing SD through campus experiences through a 'hidden curriculum' (e.g., green spaces, encouraging social interaction)

2.3.6 Governance – Structures for Participation

Governance structures constitute the framework through which an organisation is guided and supervised.

Successful implementation and management of SD efforts at HEIs require appropriate governance structures. The governance structures of a HEI depend on its type and influence the execution of the other core functions by providing the frame for power relations and management. 'Governance' offers answers to the following questions:

Who are the HEI's key stakeholders (internal/external)? How is power distributed among them? Is there room for participation?
How are stakeholders organised by the power relations (e.g. hierarchical, working groups, green officer, etc.)?
What are the rules and regulations concerning SD?
What incentives are implemented to motivate SD action and enable co-creation?

Table 6.
Guiding Questions for Governance

Governance structures determine the **degree of freedom for specific actors** by distributing responsibilities and power and allowing for or denying opportunities for participation and interactions. Through rules, regulations and incentive systems, governance represents the **organisational embeddedness of SD.**

Various studies indicate that leadership is widely recognised as a catalyst for driving change processes (Cebrián et al., 2013). The authors highlight a disparity between leaders' capabilities to initiate transformation rather than merely adjusting organisational structures and procedures, and there is a need to modernise traditional governance structures. Sustainable HEIs should strive for a future-orientated, innovative, and

interdisciplinary transformation. They need to adopt policies and practices which maximise the HEI's contribution to the SDGs across teaching, research, and community engagement. While HEI leaders usually initiate and coordinate SD activities, students and staff are the ones actively involved in these activities (Toman et al., 2023: 44).

HEIs encounter difficulties translating their vision into actions because they lack clear responsibilities and adequate support (ibid.). Internal stakeholders need active involvement from leadership, and student-led activities need more systematic structures, such as student offices or student unions (ibid). Measures in 'Governance' align with the endeavour to allow participation and transdisciplinary collaborations.

Measures in Governance

- Rethinking structures and power relations
- Governing by participation: Enabling participation, including stakeholders' involvement in decision-making processes
- Establishing SD-related governance structures such as green offices
- Implementing incentive systems, policies and regulations
- Raising awareness and offering training opportunities

Table 7.
Possible Measures in Governance

3 Capacity Frame – What is Needed

What is meant by 'Capacity'?

Which capacities are vital for the successful implementation of SD?

What possible variables influence HEIs' capacities to transform?

How do capacities relate to context and the organisational culture and structure?

The second frame is called the 'Capacity Frame' and contains six key capacities as prerequisites for a successful SD implementation at HEIs. The capacities vary in significance depending on whether HEIs align their SD strategy with their institutional vision, strategic plans, or regional context. Following Clark and Harley (2020), 'Capacity' is the **intention and potential to accomplish a task or achieve a certain outcome.** The capacities presented in this section are based on practical implications found in sustainability science, which investigates nature–society interactions. They guide the different pathways of SD, facilitate the transformation of visions into concrete actions, monitor and evaluate results, and take corrective action in an iterative and open-ended pursuit of SD (ibid.).

The SDS4HEI framework adopts the **six capacities** introduced by Clark and Harley (2020). Each capacity comprises several 'variables' (V) — **elements liable to vary or change.** Although the variables shape the respective capacities, tensions between them also exist. An HEI does not need to possess all six capacities. Different SD strategies require distinct capacities to link concrete actions to selected regional SDG targets meaningfully. In general, however, it can be said that building the six capacities allows HEIs to initiate transformation processes and become an **'Integrative HEI'.**

In the following, the six capacities are briefly described, as well as the relationship between them and their relationship to the elements of other frames.

3.1 Capacity 1 // Measuring Progress

Suppose we view SD as the many pathways towards harmony between current and future needs and between various aspects of sustainability, HEIs should be capable of making well-informed decisions considering the resources at their disposal.

Concerning SD, measurement must take two forms: **(1) Measuring and reflecting on current paths** and **(2) evaluating the impact of future pathways.** Monitoring and measuring the stocks of different resources (means) in a specific ecosystem rather than the flows of goods and services allows us to show progress made over long periods (Clark & Harley, 2020).

How can HEIs identify their most important resources? Following Clark and Harley (2020), resources can be divided into two major categories — **natural capital and anthropogenic capital** — further divided and made measurable by 'representative resource stocks'. Natural capital refers to the stock of natural resources and ecosystem functions, while anthropogenic (man-made) capital comprises manufactured, human, social and knowledge capital (Clark & Harley, 2020; Kachler et al., 2023).

Resources considered important and stocks assessed suitable as representatives depend on a HEI's 'contextual frame', including regional challenges and the 'institutional frame' – the institution's type, structure and culture.

Resource Group	Specific Resource Group at HEI	General List of Representative Stock Resources
Natural Capital		
Ecosystems	Number of students, education with SD focus, collaborations	Biomass, biodata, communities
Environment	Land use, population	Climate, quality and quantity of land, air, water
Minerals	Fossil fuels for university operations, transportation	Fossil fuels, iron, sand
Anthropogenic Capital		
Manufactured Capital	Number of green buildings, renewable energy, alternative transportation	Roads, buildings, infrastructure
Human Capital	Skilled individuals	Campus communities (incl. external stakeholders) health, educational level, distribution
Social Capital	Regulations on resource usage, incentives for participation, accessibility, inclusion	Institutions include rules, norms, rights, culture, networks, etc.

Table 8. Resources Stocks for Well-being in HEIs Ecosystems

Resource Group	Specific Resource Group at HEI	General List of Representative Stock Resources
Knowledge Capital	Diversity, entrepreneurial and sustainability-related skills, Transdisciplinarity	Indigenous, practical, scientific

Source: Based on Clark & Harley (2020: 334)

As shown on the following page, the variables affecting HEIs' ability to measure progress are represented by **six key steps** identified as essential preliminary efforts for HEIs to establish the capacity for progress measurement.

TOOL

Step 1: Choosing Central Goals

As a first step, HEIs must define their central goals. The SDG targets can be used as an orientation and align with an institution's strategic plans or the potentials and challenges identified in the 'contextual frame'.

Step 2: Defining Relevant Resources

Subject to the respective contextual frame, i.e., the ecosystem in which the HEIs are situated, HEIs must decide on meaningful representative stock resources in the two main categories (1) natural capital and (2) anthropogenic capital.

Step 3: Finding Meaningful Indicators

To gauge resource stocks, HEIs must establish measurement systems with useful indicators. Data needs to be at hand and cover all dimensions. However, many HEIs concentrate their measuring and reporting efforts on the environmental dimension of SD. Informative indicators need to be meaningful (represent information), relevant (reflective), direct (closely measure change), objective (have a clear operational definition of what is being measured and what data need to be collected), reliable, helpful, understandable (easy to comprehend and interpret) and practical. Aspects such as data collection costs and time resources are inhibiting factors.

Step 4: Evaluating Impact

One of the biggest challenges for HEIs is making the impact of their SD efforts visible and measurable. Deciding on specific SDG targets makes progress more concrete and impact more visible

Tool 2.
Six Steps Towards SD Measurement

within a region. Developing a 'Theory of Change' linking impacts to activities, outputs, and outcomes can assist in doing so.

Step 5: Adopt Integrative Perspective

HEIs are able to perceive all relevant resources as part of a particular context. They can determine the social value represented by resource stocks, move beyond single resources and asses the interactions between the different resources categories.

Step 6: Evaluate Governance Structures

Finally, HEIs should be able to evaluate the efficacy of new governance arrangements and mechanisms, for they are essential for managing and measuring resources.

3.2   Capacity 2 // Promoting Equity

Suppose SD is understood as fairness and justice among present and future generations, 'promoting equity' is necessary to implement SD strategies.

> Power relations determine the distribution of various forms of capital, opportunities and degrees of freedom.

Consequently, power differentials among actors lead to inequality. Different factors can influence power relations, for example, race, class, gender and generation. While SDG 5 (Gender Equality) specifically promotes gender inclusion, HEIs also need to include people with disabilities, migrant backgrounds, people living in rural or remote areas and those facing socio-economic difficulties or other discrimination (SDG 10 - Reduced Inequalities). HEIs are often the first place where those who have faced exclusion or been marginalised can find acceptance and support. While talent scouting, inclusion and accessibility allow more people to gain the necessary skills and knowledge to become informed citizens ('Education'), diverse knowledge resources boost innovation ('Research', 'Entrepreneurial Activities').

Governance structures are incredibly influential in promoting equity, giving an institution its legal structure and ascribing specific roles, responsibilities and power to actors. Additionally, the contextual frame and the dominant culture within an organisation and the wider region play a crucial role. Accordingly, **governance can promote equity** by critically reflecting on current structures, looking at the cultural dimension (values and norms) inscribed in laws, rights and regulations, and collaborating **with**

different stakeholders and bottom-up initiatives, such as student movements. The following variables, amongst others, can support the capacity to promote equity:

VARIABLES

Equal Access to Resources

HEIs need to increase access to education, for example, via talent scouting, accessibility and support structures. Through collaborations with companies and other organisations, HEIs can ensure employability. Following the 'Third Mission', knowledge must be made available to society and the economy.

Mechanisms of Redistribution

The redistribution of resources needs adequate support structures that allow for a flow of benefits. In this regard, new governance structures and incentive systems are required. Entrepreneurial activities and new modes of co-creation add to this variable.

Empowerment of Actors

Empowering actors who remain invisible under current pathways of SD is another vital variable. Governance paired with campus design can give actors the freedom and capacity to pursue visions of SD through experimentation. Additionally, participation in decision-making processes helps stakeholders to feel heard and motivated and creates a 'culture of sustainability' through engagement.

Restructuring

Although parts of traditional governance structures remain relevant, such as solid leadership for SD, a restructuring in favour of more participation in decision-making processes is also required. HEIs must contemplate and reshape power dynamics among actors, resources, institutions, and objectives to advance equity. It requires conventional top-down efforts paired with bottom-up participatory input.

Inclusion

Inclusion describes the possibility of diverse stakeholders shaping institutional structures, including rules and norms, to serve their interests. HEIs should address barriers to inclusion in all of their core missions.

3.3 Capacity 3 // Adaptability

As a journey with changing paths and an uncertain destination, SD is constantly threatened by unexpected events. SD strategies can become unsustainable due to unknown future challenges, shocks, and disruptions.

> Adaptive capacity refers to the capability to address potentially disruptive changes in a manner that enables the system to function within its existing structures and continue pursuing its objectives.

SD necessitates adaptive capacity at the individual and organisational levels to shape transformative change successfully. Decision-making and purposeful navigation are essential elements of adaptability. Because not all changes are adverse, adaptability offers more than just the potential to reduce harm; it also unveils fresh prospects and enhancements along the current trajectories.

Adaptability should not be mistaken for resilience, the ability to bounce back swiftly and progress with newfound knowledge, or for transformation, which pertains to fundamental changes in systems or society. The following variables can be considered essential for adaptability:

VARIABLES

Understanding Dynamics

The challenges of climate change are complex, and its effects are difficult to anticipate. Therefore, SD must operate on multiple timescales (present and future), broaden its perspective from short-term risk reduction to long-term progress and change, and consider global effects. Interrelations and dynamics play a crucial role concerning SDG targets. Trade-offs and conflicts are inevitable and must be navigated.

Flexibility

While static assessments are essential for SD, adaptability also requires dynamic assessments to redirect pathways.

Networking & Modularity

Institutions become more flexible and can adapt to multiple challenges through networking. The connectivity in a network is best arranged by the concept of modularity, characterised by relatively tight connections between sets of elements that promote

Table 10. Variables supporting Adaptability

complementarities (modules) but with modules being relatively weakly connected.

Collaboration

HEIs should work with different stakeholders and participate in networks and alliances to design interventions, including solutions, visions and policies.

Innovative Capacity

HEIs must be open for experiments and interplay with actors, institutions, goals and resources to create new practices and values.

3.4 Capacity 4 // Transformative Capacity

SD is an ongoing, open, and reflexive process that requires transformative changes, just as transformative change is a complex, co-evolving process that arises from intricate interactions among numerous stakeholders and contextual dynamics (Avelino et al., 2019).

> Transformative capacity denotes the capability of individuals, organisations, and societies to purposefully instigate profound change by exerting influence on co-evolving transformative change processes, resulting in collaborative impact production.

Instead of only adapting to challenges and disruptions, HEIs have to be able to **qualitatively change their pathways** – moving away from unsustainable paths to more sustainable ones. While research and innovation can be seen as drives of transformative change, people develop the necessary competencies and gain knowledge for transformative action through education and outreach. Governance must create safe spaces and opportunities within the organisational structure (transformational leadership), and social actors must adopt new values, beliefs and behaviours ('Organisational Culture'). Transformative narratives and imagery emphasise humans' ability to shape society and the environment. Changes in the 'Contextual Frame' can make transformation necessary, facilitate it, or complicate pathways. Transformative HEIs **reflect on themselves, are future-oriented, innovative, and transdisciplinary** and are capable of **changing their values and operations.** A transformation of HEIs requires a 'whole-institution' approach and relies on 'organisational learning'. HEIs become influential

change agents in their region through 'Third Mission' efforts. Variables important for the capacity to transform include the following:

VARIABLES

Embracing Intertwined Dynamics

Transformation must be viewed as a dynamic process entailing multidimensional shifts and qualitative changes in SD pathways.

Managing Connectivity

Transformation depends on the HEI's capacity to manage the connectivity between the micro- and meso-level and cross-level interactions regarding the flows of novelty. While introducing innovations and initiating change processes, stability must be secured.

Promoting Transformation

HEIs can promote qualitative transformations through incentives. The promotion of such a process is a necessary condition for SD.

Stimulating Innovation

At the heart of every transformation lie innovations. HEIs may stimulate innovative processes through incentive systems, the uptake of results, their promotion and distribution and the transformation of practices at the system scale.

Aiding Novelty

Novel solutions typically originate at the micro-level of organisations, encompassing technologies and [or] practices, institutional arrangements, actors' objectives, values, behaviours, and knowledge related to SD.

Overcoming Path Dependence

To leave or break established (non-sustainable) paths and overcome path dependencies, HEIs must have the capacity to disrupt established power structures, established rules, values and norms and surmount obstacles to reconfigure the HEI.

Integrating Anticipation & Imagination

HEIs should shift from sole anticipation and pathways aimed at risk avoidance (e.g., employing assessments, foresight exercises, scenarios) to fostering imagination (e.g., shared visions, goals, possibilities). Collectively shared imaginaries of a promising

future can motivate action towards new development pathways and exemplify the practical dimension of innovations.

Integrating Siloed Approaches

The pursuit of SDG targets should not happen in isolation and should not be confined solely to individual sectors or academic disciplines. A transformative HEI must handle diverse interests, approaches, and potentially conflicting objectives adeptly.

3.5   Capacity 5 // Transfer Capacity (Praxis)

Knowledge capital is a crucial resource for HEIs. To actively participate in SD, challenge behaviours and beliefs and find solutions to global challenges, HEIs need the capacity **to transfer knowledge to immediate and concrete action.**

Praxis describes the process of translating theory, lessons, or skills into practical application. It encompasses the act of applying, materialising, and embodying ideas, along with active engagement, exercising, and practicing of knowledge and skills.

Knowledge transfer is integral to 'Outreach & Partnering' and 'Entrepreneurial Activities' and has become increasingly important in 'Research' and 'Education'. Research on SD and learning for SD concentrates on **finding solutions for real-life challenges that are experimented on collaboratively, tested, and adapted within the contextual frame.** New methods of knowledge production, such as action research and citizen science, rely on greater participation from unusual social actors and increase the chance of adopting new practices. For SD to transform from innovation to institutionalisation, new activities must be consistently carried out for a sufficient duration until they become part of routines. The following variables influence HEIs' capacity to link knowledge to actions:

Co-producing Knowledge

Knowledge and society mutually shape each other. Stakeholders actively engaged in knowledge creation and developing new pathways for SD are more likely to put these into practice. Therefore, co-production and co-creation should be central to HEIs' core mission.

Diversifying Sources of Knowledge

Available knowledge can be enhanced and diversified by using multiple sources of expertise, for example, by including different actors from the 'contextual frame', conducting interdisciplinary research and education, and enhancing participation with the help of new governance arrangements.

Fostering Trustworthiness

People only adopt knowledge and [or] novel solutions/practices if they meet specific criteria, labelling them as 'trustworthy'. These criteria include saliency, credibility, practical relevance, and political legitimacy.

Boundary Work

'Boundary work' describes the efforts of HEIs to organise their relation to the multitude of borders found in science, culture, academic disciplines and society. Boundaries are flexible, performative and socially constructed and can be relocated or broken down by, for example, transdisciplinary research, new sources of knowledge, and policy making.

Training People

Education goes beyond just students; it should empower all stakeholders, both within and outside HEIs, with the skills necessary to translate knowledge into practical action. Extending HEIs' training offerings to the broader community has the potential to expedite SD within society.

Integrating Siloed Approaches

The pursuit of SDG targets should not happen in isolation and should not be confined solely to individual sectors or academic disciplines. A transformative HEI must adeptly handle diverse interests, approaches, and potentially conflicting objectives.

Table 12.
Variables affecting Transfer Capacity

3.6   Capacity 6 // Governing

'Governance' has already been discussed in the context of the 'Organisational Frame', in which it represents an overarching function within HEIs. However, by acting within the established structures and challenging these, governing is considered an essential cross-cutting capacity.

> Governance arrangements refer to the distribution of power dynamics among various elements (actors, resources, goals), which vary depending on the specific context or situation in which they operate.

Governance arrangements allow people to **work together in exercising other capacities** and joining forces to achieve SD. They **guide the use of shared resources** fairly and durably and manage the uncertainties of SD, for example, in the shape of trade-offs between SDG targets, competing visions and different understandings of sustainability.

Governance, including power relations, determines **who gets to say what** and decides what is desirable. It reigns the process, allocates resources and outcomes, and influences whether certain goals are reached. Governance is **the sum of efforts to stabilise or change existing institutional structures** (e.g., rules, regulations, norms, and practices). Due to the dynamics of SD, governance structures must be flexible, modular and open to experiments.

> Governing refers to the way people work within and around governance structures of formal authority to get things decided and done. It is understood as the activities that make a purposeful effort to guide SD.

The following variables shape a HEI's capacity to organise its elements and guide its diverse social actors:

Opening to Creative Design

SD revolves around balancing disparities within and between generations and addressing power dynamics. Governance structures should be able to orchestrate stakeholders, alleviate conflicts, empower individuals seeking a fulfilling life, and allow them to assess their efficacy.

Encouraging Reciprocity

Reciprocity, as the mutual exchange of benefits or privileges among individuals, groups, or institutions (social norm), enables the establishment of sustainable and ongoing relationships based on mutual give-and-take. Encouraging reciprocity in what is asked of them builds trust among actors and facilitates communication.

Spatial Rescaling

Contemporary governance expands beyond single organisational tiers and now operates across multiple interconnected levels, from local to national and even global scales.

Engaging New Actors

Participatory governance strategies are more likely to successfully balance flexibility and stability when they purposively engage stakeholders early and often. Governance should be able to respond to feedback and changes in the contextual frame while being stable enough to function as a framework for actors.

Polycentric Systems

Multiple sources of partial authority interact to create multi-level governance arrangements that may or may not guide collective behaviour toward shared goals.

Expanding the Tool Kit

Formal rules and regulations are necessary to guide collective behaviour toward more sustainability. These, however, are to be enriched by complementary tools, including generative tasks such as identifying emergent issues and openly discussing them, promoting norms, and governing through goals.

Rejecting Panaceas

With SD, there is not one right way to guide change. Instead, it is vital to match governance arrangements to the characteristics of

Table 13. Variables affecting Governing

the action situation being governed, the contextual frame and the organisational culture.

Being Reflective

Governance must be able to question its core commitments, using foresight to balance the interests of present and future generations and achieve long-term SD, i.e. reflexive governance.

Enhancing Equity

Action is not only driven by rules and regulations alone but also by norms. Governance must foster values promoting human rights, environmental justice, intra- and intergenerational equity, etc. Empathy and bottom-up approaches, e.g. student movements/initiatives, are useful.

TAKEAWAYS

The 'Capacity Framework' comprises **six essential capacities** necessary for the effective implementation of SD within HEIs:

- Progress measurement capacity
- Equity promotion capacity
- Adaptive capacity
- Transformative capacity
- Transfer capacity (Praxis)
- Governing capacity

The **significance** of these capacities differs depending on whether HEIs align their SD strategy with their institutional vision and strategic plans or with their regional context. Additionally, different SD activities build on different key capacities.

4   Contextual Frame

What distinct contexts constitute the 'Contextual Frame'?
Why is connecting SD strategies and actions with the wider region useful?
How do SDGs and regional context interact?

The 'Contextual Frame' is the outermost frame of the SDS4HEI Framework Model. It represents an overarching dimension consisting of the various contexts by which HEIs are shaped and which are reciprocally shaped by them. Cultural, social and physical settings influence every human interaction. Therefore, **the contextual frame considers the general conditions determining culture, efforts, and scope of actions** regarding SD in a particular region. The frame contains (1) the political, (2) the institutional, (3) the economic, and (4) the societal/cultural context.

Although climate change and its effects are a global challenge and the multidimensional and complex SDGs are considered a blueprint shared worldwide, context still matters. Across all HEI disciplines — entrepreneurship, humanities, the Arts, etc. — curricula align with international quality standards. However, there remains variation in how they are taught within the context of SD. This diversity is accentuated by industrial/economic histories, meaning that some countries are stronger in, say, Economics, while others excel in Humanities.

In addition, not every SDG is equally important to every region and HEI. For example, regions close to the sea may want to target different SDGs (e.g., SDG 14 – Life Below Water) than smaller universities of applied sciences in the countryside (SDG 11 – Developing Sustainable Communities). The setting of goals and the implementation of activities are never done in a 'vacuum space'. Instead, regions possess various SD needs, barriers, opportunities, and potentials. With the help of the SDGs, HEIs should aim to select targets that support regional development whilst also impacting the global level. HEIs can either choose a **(1) challenge-orientated approach,** focusing on the necessities that need to be addressed to secure the quality of life in the region, or a **(2) potential-orientated approach,** building on already made advancements in the region.

Relevant elements in the contextual frame that impact HEIs' efforts to implement SD strategies are called **'factors' (F).** In the following, the four essential frames constituting the contextual frame will be described briefly:

4.1 The Societal/Cultural Frame

> The societal and cultural frame refers to the values and beliefs shared by a society within a region.

The region's history and traditions influence societal/cultural frame. **Culture** finds its expression in many different factors, for example, language, values, norms, artefacts, rituals, clothing, stories and symbols. It plays a crucial role in shaping how SD and transformation are **comprehended,** how the imperative for action is **perceived** and enacted, and whether and how SD and transformation efforts are **evaluated.**

Through narratives, this frame also **influences the expectations and motivation** of regional actors, including HEIs, political actors and companies, to participate in shaping a more sustainable future. Tension arises when actors with different values, interests or understanding of SD (weak vs. strong) must engage in joint endeavours. Culture, as a frame for social interactions, is closely related to the societal frame.

The **social context,** also known as the milieu, describes the immediate social and physical conditions of people that form their environment. It influences how someone perceives and reacts to something in a specific situation. Additionally, the institutional and political frame also shape how actors interact with one another in a social context. Factors include social roles, economic status, language, expectations, solidarity, social groups, and demographics.

Concerning SD, HEIs might want to ask themselves:

> What is it that the society in our region needs?

4.2 The Institutional Frame

> The institutional frame describes the systems of formal laws, regulations and procedures that shape socio-economic activities.

The **institutional frame** impacts SD through factors such as rules, laws, regulations and actors', including HEIs', practices have to adhere to in one region. It creates opportunities for, facilitates or limits sustainable endeavours.

In the context of SD, the ideal institutional frame would equally integrate the three sustainable dimensions (economic, social, and environmental). It should be inclusive, transparent and effective. The institutional framework for sustainable development should be **action- and result-oriented**, giving due regard to all relevant cross-cutting issues to contribute to the implementation of SD. Forms of government influence the institutional and political frames.

HEIs might want to ask themselves:

> What does the institutional frame facilitate or impede when it comes to sustainable activities and their diffusion?

4.3 The Economic Frame

The **economic frame** encompasses factors relating to the **dominant economic system** within a region, including unemployment rates, number of patents issued, gross national product, amount and kind of education, general income and income inequality, upward economic mobility, number of new businesses and exchange rates.

All these factors influence regional development and can be connected to SD. HEIs can impact a person's ability to access the labour market by teaching entrepreneurial skills and ensuring employability. University spin-offs shape the economic frame through agility, innovation and potential growth. Additionally, international partnerships and knowledge exchange also help to adopt SD practices.

The political frame influences the economic frame through policy choices, research through new findings and technological advances.

HEIs might want to ask themselves:

> What are the needs and potentials of our regional ecosystems and where can we add value?

4.4 The Political Frame

The political frame describes the predominant structures of political power and how they directly or indirectly influence the decisions of actors and institutions.

Important factors influencing the **political frame** include economic conditions, identity politics, government policies and initiatives, ideologies, interest groups, world events, political systems, social issues and activism. Politics are concerned with **making choices and decisions** for a region, and political actors engage in negotiating, compromising and pursuing goals.

HEIs can support a political power to foster or challenge **specific agendas**. Legal restraints and policies impact the effectiveness of SD measures, and political events may have a disruptive effect, making adaptations of the pathways necessary. The political frame greatly influences which subjects become part of the political agenda and are considered for further support and funding.

Concerning SD, the political frame may or may not support sustainable innovations and the system's transformation.

HEIs might want to ask themselves:

Which political force do we want to support to accelerate SD, and where must we intervene to challenge given political frameworks?

TAKEAWAYS

Context matters: The contextual frame considers the general condition determining culture, efforts, and scope of SD-related actions.

HEIs can opt for **(i) a challenge orientation,** focusing on the necessities to be addressed to secure the current and future quality of life in the region or **(ii) a potential orientation,** building on advancements made in the region.

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Contact

Dr Judith Terstriep
Westphalian University of Applied Sciences Gelsenkirchen
Institute for Work and Technology
Munsteidstr. 14
D–45886 Gelsenkirchen

M: terstriep@iat.eu
W: https://sds4hei.eu/